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SIX DEGREE OF FREEDOM FORTRAN PROGRAM, ASTP DOCKING DYNAMICS, USERS GUIDE

ROCKWELL INTERNATIONAL CORP., DOWNEY, CALIF. SPACE DIV

JUN 1974

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SIX DEGREE OF FREEDOM FORTRAN PROGRAM
"ASTP DOCKING DYNAMICS"
USERS GUIDE

JUNE 1974

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ABSTRACT

Documentation of the digital program "ASTP Docking Dynamics" is intended to sid the engineer using the program to determine the docking system loads and attendant vehicular motion resulting from docking two vehicles that have an androgynous, six-hydraulic-attenuator, guide ring, docking interface similar to that designed for the Apollo/Soyuz Test Project (ASTP). In its present form, the program is set up to analyze two different vehicle combinations: (1) the Apollo CSM docking to the Soyuz and (2) the Shuttle orbiter docking to another orbiter. The subroutine "RCS" modifies the vehicle control systems to describe one or the other vehicle combinations; the rest of the vehicle characteristics are changed by input data.

To date, the program has been used to predict and correlate ASTP docking loads and performance with docking test program results from dynamic testing conducted at NASA JSC in Houston. The program was written by Mr. John A. Schliesing, of NASA JSC, and modified for use on IBM 360 computers. Parts of the original docking system equations in the areas of hydraulic damping and capture latches were modified so that they may better describe the detail design of the ASTP docking system.



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INTRODUCTION

This user's guide documents the "ASTP Docking Dynamics" Fortran-H computer program. The program computes docking system loads, vehicle loads, kinematics of the particular docking system design used in the Apollo/Soyuz test project, and motion of docking vehicles in response to docking loads and vehicle control system activity from the point of initial docking contact through capture latch activation and eventual draw down. The program does not include hard structural latching or hard docking dynamics.

The program treats the two vehicles and docking ring as rigid bodies each with six degrees of freedom and a structurally compliant and hydraulically attenuated docking interface between the ring and the active vehicle. The program output is in real time print and optional time history plots of loads and motion of the docking system and both vehicles.

The basic program was written for UNIVAC by NASA and modified by J. Rolley, L. Fesler, and B. Mikhalkin to be compatible with IBM O/S 360 Model 85 computing equipment at the Space Division of Rockwell International.

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PROGRAM DESCRIPTION

The "ASTP Docking Dynamics" program is recorded on nine-track magnetic tape and is available from the Rockwell Space Division computer library by calling for the mounting of tape UH9552 in the JCL cards. The program listing, source decks, and object decks are retained in Department 214, Group 420, for possible future modification and as a backup for the library tapes. The last two sections of this document contain program flow diagrams and locations of primary functions to aid the engineer in troubleshooting or finding where modifications to equations may be made.

DOCKING SYSTEM

The docking system described mathematically in the "ASTP Docking Dynamics" program is presented in Figure 1. The passive or target vehicle docking system is presented in Figure 2. The docking mechanism concept is a tunnel with peripheral shock absorbers connecting an androgynous floating interface. The androgynous feature of the docking interface is provided by a symmetrical distribution of guides and capture latches on the active vehicle guide ring. During docking they are meshed with the reverse symmetry guides on the passive vehicle guide ring. The guide ring of the active docking system is extended from the structural base ring on six hydraulic attenuators in preparation for docking. The passive system guide ring remains retracted. Extention is by springs inside the attenuators. Initial contact is made between guides and guide rings. Miss distance and angular misalignments are indexed into alignment by the guides. Once the guide rings are coincident, the active system capture latches engage the passive vehicle's body-mounted latches for initial mechanical connection of the two docking vehicles. Attenuator hydraulic damping and extend springs control the relative motion of the two vehicles. Once the vehicles are stabilized, the active system cable retract mechanism is activated, and the two vehicles are drawn together until the structural base rings and docking tunnel seals engage. Structural ring latches are then actuated to provide a rigid structural interface between the now hard-docked vehicles.

The "ASTP Docking Dynamics" digital program can duplicate all the operations for docking except tunnel sealing and structural ring latch.

Presented in Figure 3 are the coordinate systems and vector directions used to describe the docking systems relationship with respect to each vehicle and the inertial frame. Each vehicle and the active docking system guide ring are represented as bodies with point mass. The order of rotation to resolve one body's axies system into another is shown on Figure 4.

VEHICLE GEOMETRY

To date, two different vehicle combinations have been simulated for docking loads and dynamic analysis. Figure 5 shows the vehicle geometry of



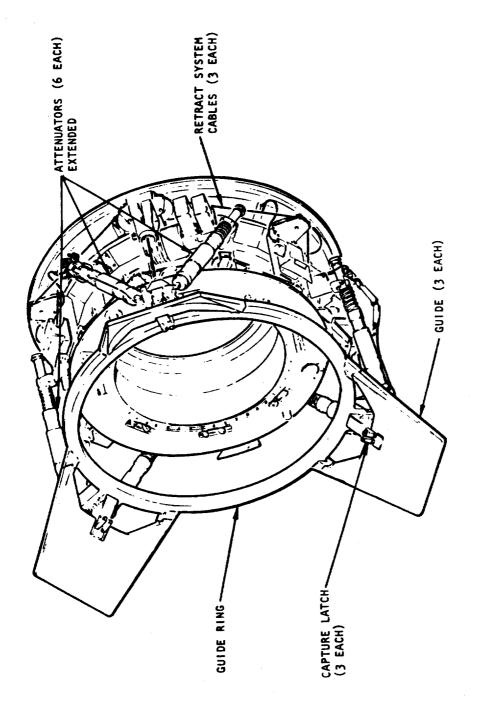


Figure 1. Active Vehicle, Active Docking System

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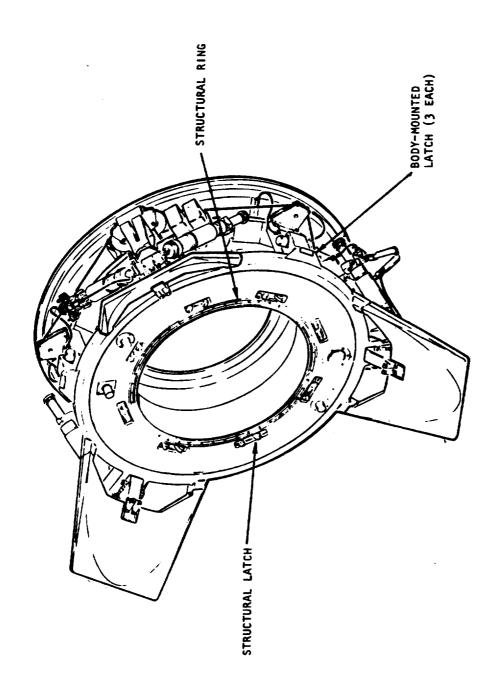
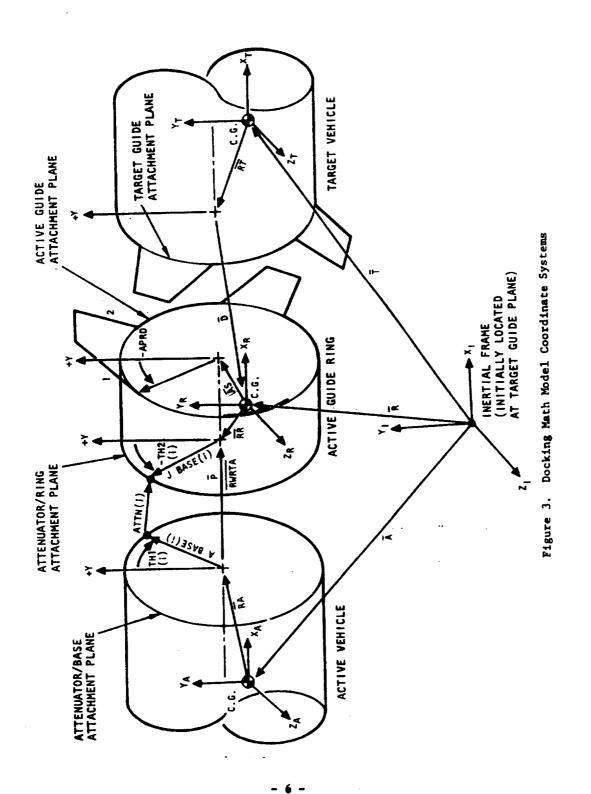


Figure 2. Target Vehicle, Passive Docking System







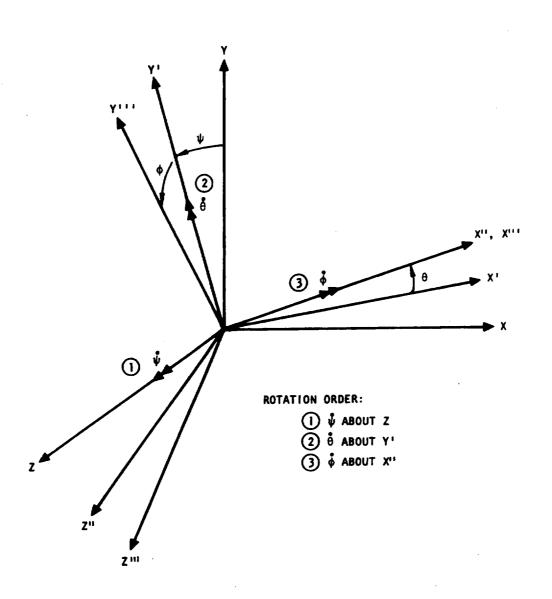


Figure 4. Euler Angle Rotations



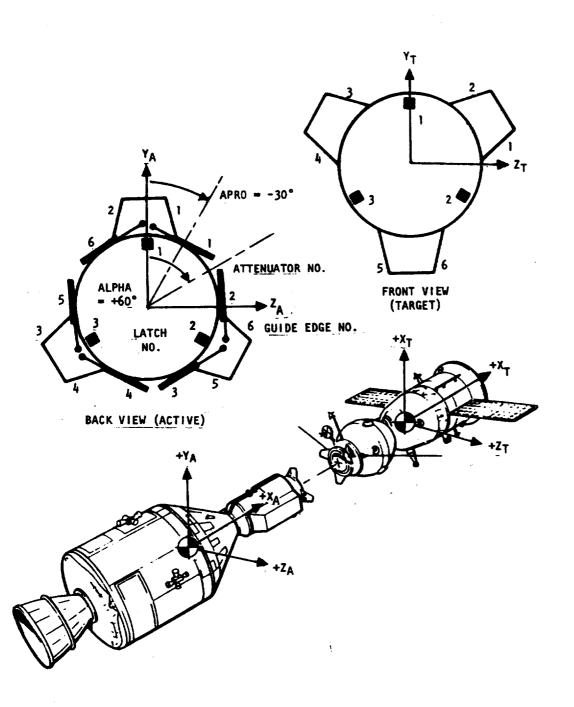


Figure 5. Apollo CSM/Soyuz Docking Model



the Apollo CSM docking with the Russian Soyuz spacecraft. Figure 6 shows the Shuttle orbiter docking with another orbiter. In each instance, the docking system is parallel with the X axis as required by the math model. This requires the user to rotate mass properties of the vehicles to the axis system used by the math model. Notice that the guide location with respect to the +Y axis in each instance is different depending on the values assigned to the geometry input APRO and ALPHA.

VEHICLE CONTROL SYSTEMS

The "ASTP Docking Dynamics" program includes reaction jet control systems for three different vehicles: The Apollo CSM, the Soyuz spacecraft, and the orbiter. All three are basically attitude and rate-feedback control systems that activate specific combinations of reaction jets which generate pitch, yaw, and roll moments. These moments counteract any external forces, like docking, in an attempt at maintaining a particular inertial attitude.

In addition to attitude hold, the control system may be commanded to provide closing thrust of translation jets oriented parallel to the X axis of each vehicle. Closing thrust is cued by time after contact and terminated at some specified time after capture latch engagement of the docking system.

The attitude-hold control system of either vehicle can be switched to the "rate damping only" mode or into the "free" (no control) mode at some specified time after docking capture latch engagement.

The attitude-hold control system is of the general form shown in Figure 7 and is common to all three axes of rotation on all three vehicles. Figures 8, 9, and 10 present the reaction control jet configuration activated by the control systems for the CSM, the Soyuz, and the orbiter.

At present, the control systems are defined in subroutine "RCS." However, there are two models of this subroutine. One describes the CSM and Soyuz, and the other defines orbiter-to-orbiter control system configurations. A modification to the program is being planned to include both RCS subroutines with a call symbol to define which one is desired.

EQUATIONS OF MOTION

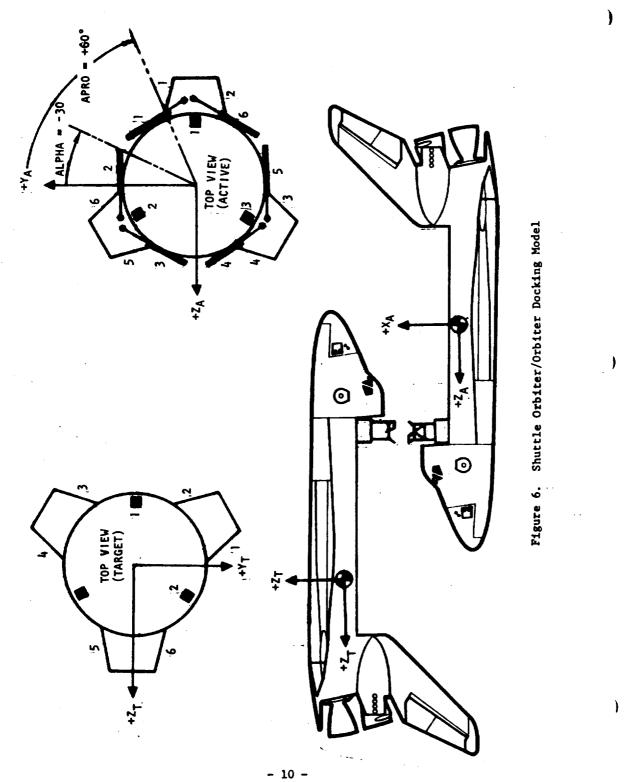
Time-dependent equations of motion, oriented with respect to a body-axis system in an inertial frame (nonprincipal) for three bodies, i.e. active vehicle, docking ring, and passive vehicle, are from the classic Newtonian mechanics found in any good dynamics text or in engineering handbooks such as "Marks' Mechanical Engineers Handbook." The generalized equations are of the position, velocity and acceleration form as follows:

$$r_0 = r_q + r$$

$$V_0 = V_q + r_\omega + V$$

$$a_0 = a_q + r(\omega + \omega^2) + 2V\omega + a$$





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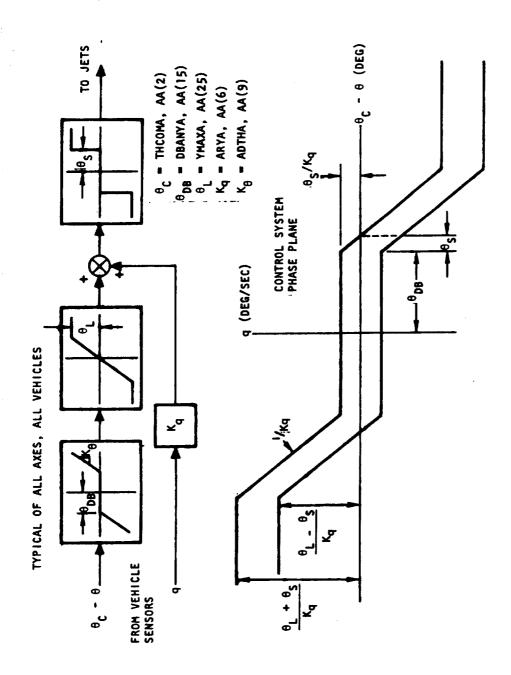


Figure 7. Attitude Hold Control System Characteristics



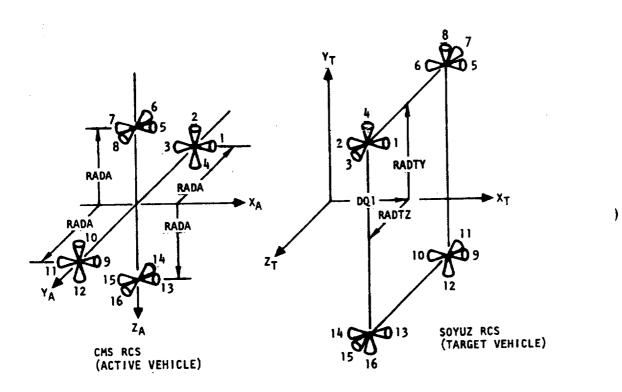
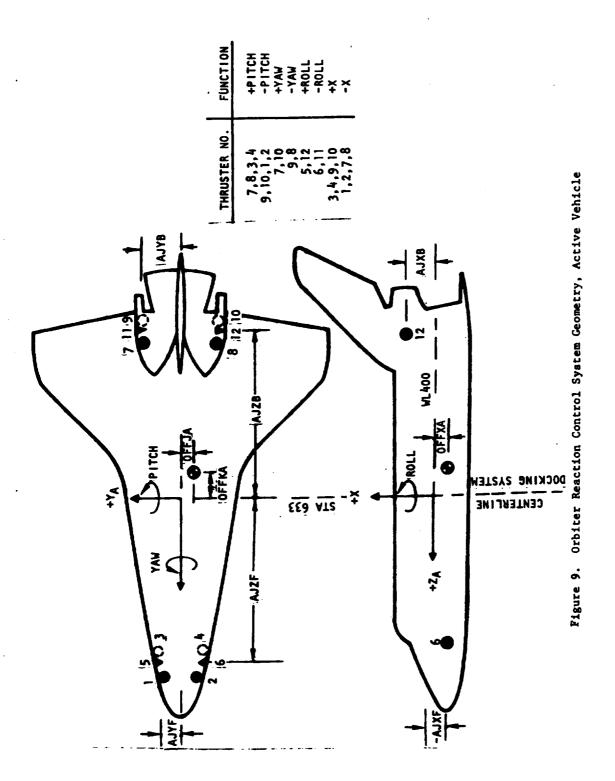


Figure 8. Reaction Control System Geometry

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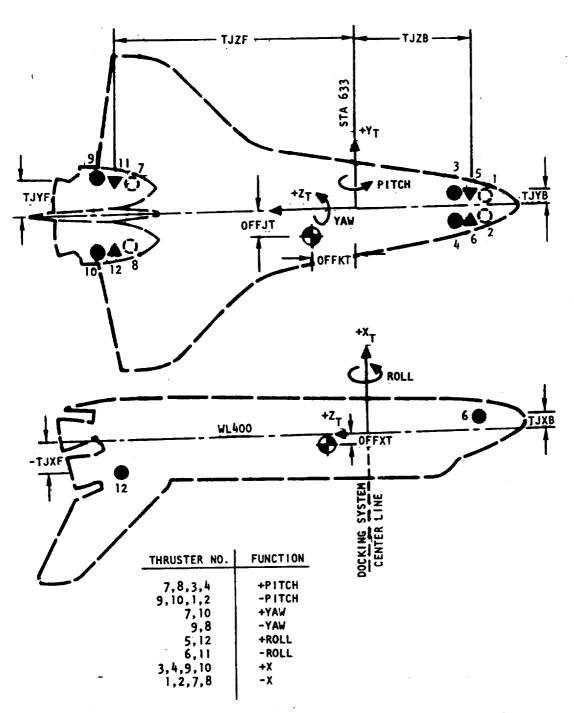


Figure 10. Orbiter Reaction Control System Geometry, Target Vehicle



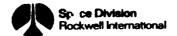
The foregoing equations were expanded into the X, Y, Z axes by John A. Schliesing of NASA for the docking dynamics mathematical model. Interdependent sets of the six basic force and moment equations were developed for each of the three bodies relative to its own center of gravity, but referenced to the coordinate system of the target vehicle. To facilitate relative values between the bodies. The equations are:

$$\Sigma F_x - Ma_x = 0$$
 $\Sigma M_x - I_x \dot{\phi} = 0$
 $\Sigma F_y - Ma_y = 0$ $\Sigma M_y - I_y \dot{\theta} = 0$
 $\Sigma F_z - Ma_z = 0$ $\Sigma M_z - I_z \dot{\psi} = 0$

The locations of the foregoing equations are identified by subroutine in the last section of this guide.

PROGRAM LIMITATIONS

- 1. The docking program starts itself by positioning the two vehicle centers of gravity with the proper miss distance and angular misalignments at the interface, but with a relatively large axial distance between the docking interfaces. It then iterates by incrementally reducing the axial separation until contact occurs between the docking system guides or guide rings. Once the contact point is established, the vehicles are mathematically released to continue dynamics at the input relative velocities and angular rates. If the geometries of the guides and guide rings are not compatible with the input miss distance and angular misalignment, i.e., a guide misses the oncoming guide ring, the program will continue operating until some computation sees a metal-to-metal penetration that results in a step load of millions of pounds or until a sine/cosine function tries to take the square root of a negative number. An abnormal termination of the run will result.
- 2. Some of the input values cannot be zero without causing the program to terminate on divide check errors. It is suggested that a small positive number be used instead of zero; otherwise, a search through the listing is in order to determine the effect of the zero prior to a run.
- 3. There are no small angle approximations in the mathematical descriptions.
- 4. The program is written on a "flat" earth basis; i.e., orbital mechanics have not been included.
- 5. There are three time stops in the program that limit run time. The first stop permits a specified run time during which capture must be accomplished; otherwise the program will terminate. The second time stop specifies the duration of post-capture dynamics. The



third time stop is determined by the CPU time specified in the JCL cards. It is recommended that all three input time stops be utilized to prevent waste of auto comp time, print, and plotted data.

- 6. Since the integration package uses the same integration interval for all three body masses, the smallest mass will determine the size of integration interval that can be used. The larger the interval, the less the auto comp time required, until the interval becomes large enough to cause numerical instability in the dynamics of the smallest mass of the three bodies. At present, some investigation is required to optimize the integration interval to use with a particular set of docking masses.
- The print interval can be specified in the input data. Care should be exercised in selecting the print interval to prevent the generation of a massive amount of paper.



INPUT DATA

The input data for the "ASTP Docking Dynamics" program are best displayed on the keypunch decimal data forms presented in this section. The data are arranged in lettered arrays in an attempt at maintaining a rationale order. As the program is modified, the order is sometimes violated. The following is the present order of input data as seen in the data forms:

Data Type	Array	Page
Vehicle mass properties	A & B	1
Attenuator locations, guide ring spring constant, hydraulics	С	2 & 3
Initial contact conditions	C & T	3 & 11
Retract mechanism	D	4 & 5
Plot and print controls	E	5
Integration controls	F	6
Active vehicle (CSM) control system	AA	6 & 7
Target vehicle (Soyuz) control system	AT	8 & 9
Orbiter control system	GBABY	7 & 8
Attenuator orifice areas	C0	10
Attenuator stroke at orifice areas	SS	10
Guide ring mass properties	ADD	11
Guide locations, latch spring constant	ADD	11 & 12
Attenuator tension spring	ADD	12 & 13
Attentuator return spring and stroke	ORD, ABB	13



Data Type	Array	Page
Attenuator tension or return orifice vs. stroke	C02,SS2	15
Retract motor torque vs. RPM	TQE, RPM	15 & 16
Run title		
Run configuration indicators	Intergers	17

DEFINITION OF INPUT DATA NOMENCLATURE

Input data nomenclature is listed and defined in the description column of the example decimal data forms. Additional explanation is required of some of the more complex input data as follows:

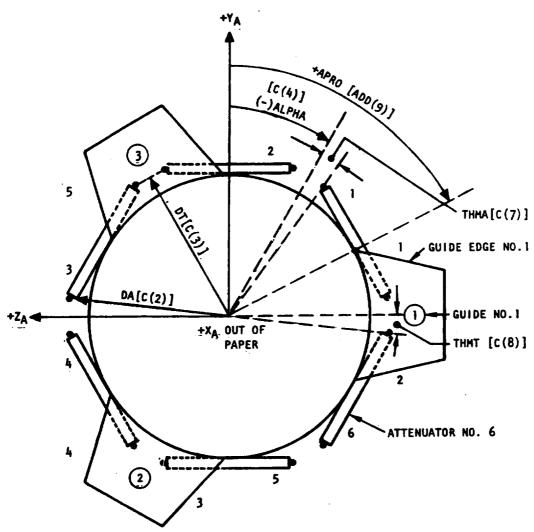
- C(2) through C(8) locate attenuator connections to the base structure and the guide ring as shown in Figure 11. Angles are positive in the directions shown. The geometry of the guides on the target vehicle duplicate those on the active vehicle. The corresponding target guide edges are numbered as shown in Figure 12.
- Figure 13 defines attenuator orifice areas and piston areas and presents a diagram of the attenuator.
- 3. Docking contact conditions (i.e., relative velocity and position combinations existing at initial docking contact) selected for maximum load analysis should satisfy the following general requirements:
 - a. Magnitudes should be within the design docking contact conditions listed in the specifications.
 - b. Combinations should be in a direction to maximize the energy of contact.
 - c. Conditions should exercise as many possible loading points and mechanism functions as practical.

The initial contact conditions are defined as follows:

The relative closing velocity is defined as +X velocity between the vehicle C.G.'s in the passive vehicle axis system.

The relative lateral velocity is defined as a combination of Y and Z velocities between the vehicle C.G.'s in the passive vehicle axis system.





ALPHA, C(4) - LOCATES THE ATTENUATOR ATTACH POINTS
ON THE BASE STRUCTURE OF THE ACTIVE
VEHICLE FOR ATTENUATORS NO. 1 AND 2
IN DEGREES. ATTENUATORS ARE NUMBERED
COUNTERCLOCKVISE LOOKING IN THE
-X DIRECTION.

APRO, ADD(9) - LOCATES GUIDE EDGE NO. 1 INTERSECT WITH THE GUIDE RING IN RADIANS.
GUIDE EDGES ARE NUMBERED CLOCKWISE LOOKING IN THE -X DIRECTION.

Figure 11. Active Docking System Guide Edge and Attenuator Locations

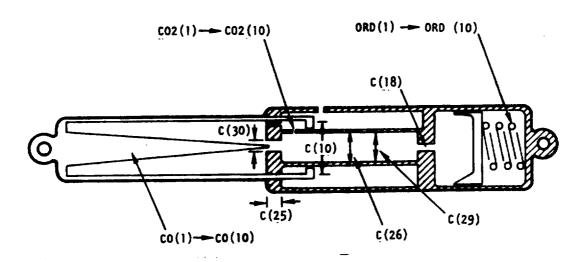


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Figure 12. Target Docking System Guide Edge Location

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- C(10) ATTENUATOR RETURN CYLINDER AREA, AC FOR RETURN
- C(11) PUT IN A LARGE NUMBER, EQUATIONS NOT VALID FOR RETURN
- C(18) ACCUMULATOR ORIFICE AREA, SAPO
- C(25) METERING PIN ORIFICE LENGTH, DLGTH
- C(26) RETURN INNER CYLINDER AREA, B FOR RETURN
- C(29) ATTENUATOR COMPRESSION CYLINDER AREA, AC FOR COMPRESSION
- C(30) OPEN METERING PIN ORIFICE AREA, B FOR COMPRESSION
- CO(1) CO(10) RESULTING ORIFICE AREA AS PIN MOVES
- SS(1) SS(10) STROKE AT POINTS OF PIN ORIFICE AREA
- CO2(1) CO2(10) RETURN ORIFICE AREA ARRAY
- SS2(1) SS2(10) STROKE AT POINTS OF RETURN ORIFICE AREA
- ORD(1) ORD(10) SPRING FORCE ARRAY
- ABB(1) ABB(10) SPRING STROKE PER LOAD ARRAY

Figure 13. Attenuator Characteristics



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The <u>miss distance</u> between vehicle docking systems is measured normal (Y and Z directions) to the passive vehicle X axis to a point defined by the centerline of a plane passing through the forwardmost part of the active docking system.

The relative angular velocity between the docking vehicles axes of rotation assumes the passive vehicle has no angular rate and the active vehicle is rotating about any of its axes. The direction of angular velocity will be chosen to amplify the lateral velocity at the docking interface to provide maximum loads and more difficult capture conditions.

The <u>relative attitude</u> between the docking vehicles axes of rotation assumes the passive vehicle is at zero inertial attitude and the active vehicle is misaligned for maximum loads and capture performance. The direction of the angular misalignment will be selected to align the active vehicle X axis as near as possible to the total C.G. relative velocity vector.

The following input data locations define the initial conditions at docking contact:

- C(19) THDRO Angle about + X_T (right-hand rule) measured from + Y_T to the radial in which miss distance is to exist.
- C(20) XMISS Lateral distance between docking system centerlines, miss distance, unfortunately named XMISS.
- C(40) THANG Angle about + X_T (right-hand rule) measured from + Y_T to the plane of pitch/yaw misalignment.
- C(41) THTOT Relative angular misalignment in the pitch/yaw misalignment plane.
- C(42) THVEL Angle about + X_T (right-hand rule) measured from + Y_T to the radial in which lateral velocity is to exist.
- C(43) VL Radial velocity, relative laterial velocity.
- C(44) OMEGR Relative roll rate.
- C(45) OMEGT Relative angular rate in the pitch/yaw plane.
- C(46) THOMEL Angle about $+X_{\rm T}$ (right-hand rule) measured from $+Y_{\rm T}$ to the pitch/yaw plane in which angular rate is to exist.
- T(25) XAD Closing velocity in the +XA direction.

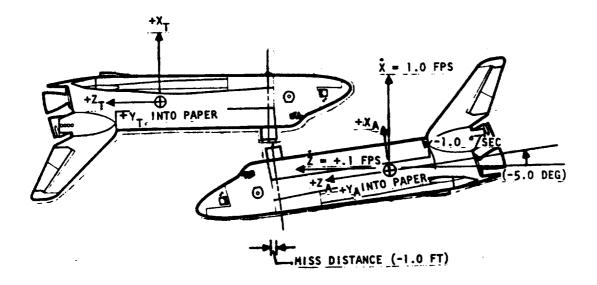
The above input for initial conditions is demonstrated by the example shown in Figure 14.



DESIRED CONDITION

REQUIRED INPUT

Ż	CLOSING VELOCITY	= 1.0 FPS	T(25) = 1.0
Ÿ	LATERAL VELOCITY	= 0 FPS	C(42) = 90. $C(43) = +0.1$
Ż	LATERAL VELOCITY	= +.1 DEG/SEC	
ė	PITCH RATE	1.0 DEG/SEC	C(46) = 90. $C(45) = -1.$
ψ̈́z	ROLL RATE	- O DEG/SEC	
φ,	YAW RATE	- O DEG/SEC	c(44) = 0.0
θr	PITCH ANGLE	= -5 DEG	C(40) = 90. $C(41) = -5.$
$\psi_{\mathbf{Z}}$	ROLL ANGLE	= 0 DEG	(40) - 301 - CO.
φ _x	YAW ANGLE	- O DEG	T(14) = 0.0
Y	MISS DISTANCE	= 0 FT	C(19) = 90. $C(20) = -1.0$
Z.	MISS DISTANCE	= -1.0 FT	



THE DOCKING SYSTEM CENTER LINE MUST BE INPUT PARALLEL TO THE MATH MODEL X AXIS; I.E., MASS PROPERTIES NORMALLY PUBLISHED WITH X AXIS POINTING OUT THE FRONT OF THE VEHICLE MUST BE ROTATED TO PARALLEL THE DOCKING SYSTEM.

Figure 14. Diagram of Initial Conditions



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- 4. The maximum load search interval E(4) and case number I(5) provide punched card data at time slices where maximum loads occur on the target vehicle docking system. The cards are used in an ancillary program, written by Herb Reed in Department 215, to print out maximum loads data in the format used in ASTP documentation. The ancillary program has not yet been incorporated in the "ASTP Docking Dynamics" program.
- 5. The CRT plotting subroutine stores 1100 data points per parameter. If E(8)-DESLC is input too small, plotted data points will end before the run stops. If E(8) is input as >100 seconds, the program will automatically set the plot interval to spread the data points throughout the run time input in E(3) summed with ADD(74).
- 6. Both the active vehicle and target vehicle control systems can change control modes based on time prior to capture latch and time after latch engagement. AA(1) specifies a time after contact that closing thrust will be applied to the active vehicle. AA(18) specifies how long after capture latch closing thrust will terminate. AA(17) set equal to -1.0 will cause the active vehicle attitude rate gains to switch to the values in AA(19), AA(20), and AA(21), which, if set equal to zero, will simulate the "free" or "drift" mode. All other control system parameters are defined in the control system discussion.
- 7. The guide ring mass properties, guide location, and guide geometry are described by input data ADD(1) through ADD(18). All are self-explanatory except ADD(14) through ADD(17), which are clarified in Figure 15.
- 8. The capture latch is a roller that locks in bearing on a 45-degree surface of the target vehicle interface at the center of each guide. The spring constant of the latch and backup structure, as well as the resulting latch load, is oriented internal to the program at a 45-degree angle. The load direction on the roller is radially outboard at the center of each active guide 45 degrees off the +X axis as shown in Figure 5.

SHUTTLE ORBITER DOCKING INPUT DATA

The following pages are a list of the loads analysis, computer input data. The input data describe the docking system characteristics, docking vehicle mass properties, and vehicle control system characteristics as used for orbiter docking to orbiter.



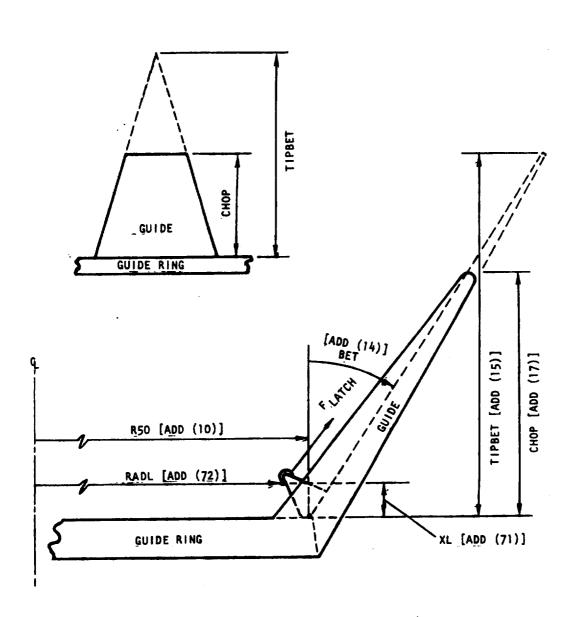


Figure 15. Guide Geometry



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DECK NO.	PROGRAMMER	ER.	DATE PAGE 2 of /7 JOB NO.	
BER	0	IDENTIFICATION	DESCRIPTION DO NOT KEY PUNCH	UUITS
0.0+0.0			C(1) NOT USED	
42.24		ATTENUMTER	C(1) DA , RADIUS TO ATTENUATOR @ GASE	7
12.74		0 141/ 1/E OM	C(1) DT , RADIUS TO ATTENUATE (P RING	2
- 2 O O	-	3 3 3 2		DECKEES
1	-		C(S) RXT, =+1.0 RATACHIL GUBM, =-1.0 INTROML	WA
\$ 40.0			c(6) NOT USED	
0 0 1 1	•		C(7) THMA HALF ANGLE BTWATTER @ BASE	DEGRATES
7 7 1	•		C(8) THMT, " . 6 RING	×
1497800.			C(9) SKS, RING AKIAL SPRING CONSTANT	L85/FT
7 / - 1 +			C(10) AC , RETURN CYCINDER AREA	רעו
+1000		8	c(11) most a	101
0.0+	•		C(12) NOT USED	
	1		د(۱٤) به ب	
<u> </u>			., (16)	
10.0	1		, , , , , , , , , , , , , , , , , , ,	
			CIND FRICP, ATTENUATOR RUMING FARTION	1.65
0.0+		7	c(1) NOT USED	
+0.391			C(18) SAPO, ACCUM. PISTON DAFICE AREA	181
+ 0. 0	<u>'</u>	I INITIAL COMPTION	C(19) THORD, ANGLE WAT 1- ARIS TO MASMIC MINS	DROMES
0.0+			C(20) XMISS MISS DISTANCE OUT RADIAL	1
0.0+			c(21) NOT USED	
0. /+ EJ			(11) NOT USED	=
0.0+	-		RSX X-DIST TO STRUCTURAL	=
+2.135			RSR	11
FCRM III-C (3CNO)				

ORIGINAL PAGE 18 OF POOR QUALITY

DIGIT DECIMAL DATA

FORTRAN



NUMBER +0./2 -	PROGRAMMER	ER	UATE TAGE CO. U.	
- 2/	0	IDENTIFICATION	DESCRIPTION DO NOT KEY PUNCH	UNITS
7		1++00.00	C(25) DLGTH , ORIFICE LEWNT	3
1	1			5
7779	1		×	1W 1/56C
S	۲.		A CAR OF A MARKAULIC FLUIS MASS DENSITY	L6'564/W*
0000	+			10 2
4	1	7 Switch and William 1900		ıΩı
19035	1		11/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1	
*0.0	1		C(3) - C(3) CAR (MIX	
+				
		Contraction Contraction	1	DRUMS
0,0	1			
0	, 4	(r		
0.0	•	~	(くなし) THVEL,	-
	1			FT/S#C
	1		Chuk Darres	DE6/5RC
•	F			•
9	1			DECARES
0	1	1	┫	
-			さく(チン) フッ語コート・語大のよれて	
0.0	•		۲(۴۱) ۴	
0 0 +	•		c(44) " "	-
1			(65)	
_				-
-	<u> </u>			_



	DECK NO.	PROGRAMMER	MER	DATE PAGE 4 of 17 JOB NO.	
L	NUMBER	٥	IDENTIFICATION	DESCRIPTION DO NOT KEY PUNCH	UNITS
	0 + 0 0			D(1) USAD INTERNALLY	
2	40.0	-		ν" (1)σ	
8	+0.0+	-		1/3) " " "	
5	+0.0	-		D(v) NOT USED	
2	0 - 1+	1	[08	D(5) >0.0 REINITIALIZES STANDARD DATA	N/b
٤	7	-		D(6) SPAN(1), CABLE LENGTH, MOTH TO ATTACK!	FT
-	+7.5	-	RETURN	11 (2) NP4 (2)	7.4
	+7.5	-		D(8) 5 PAN(3)	11
R	+ 0.0	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		D(1) SPAN (4)	•
দ্র	0 0 +	-		D (10) S PAN (5)	
इ	40.0	-		D (11) SPAN (6), " 11	11
اقا	+0.0			D(11) USED INTERMACLY	
U	0.0+	-		D(13) "	
1	40.0			D(14) m	
E	10.0	-		D(15) OMIECH, MOTOR MATR, = GO WAKESS REWISTELLY	XAD/SEC
3	861.0+			D(16) RPULL, CABLE DRUM RABIUS	FT
E	1111	1 - 1		D(17) X B , DIST, FRM, ATTN. BASE TO ATTNCH PT.	1
	123400			D(13) SKCAB, CABLE SPRING CONSTANT	185/55/67
<u>[-]</u>	+30.0			D(19) WAIT, RETRACT START TIME	Seconds
	+0.0			D(10) X CR, DIST. FRM. ATTN. END TO CABLE ATMICH	FT
रा	+2.54				×
5)	+2.54			D(22) CRADE, RADIUS TO RING CABLE ATTHCH	5
\$	40.0				
ē .	+0.60				9/10
•	FORM HA-C-IN 47ND				·

DIGIT DECIMAL DATA

FURING CONTING 8

- 29 -



,	UNITS	0/10 200	eTIA SLUG-FT2							THE SECONDS	-	IARCHEO N/D		VAL SACONUS	" 74					·					
DIGIT DECIMAL DATA	ă	GEAR CEAR RATIO, ROUTK MOTOR	Y	NOT USED	NOT USED	USED INTERNALLY	* **	" "	11 1	STOP, STOP THING PRIOR TO CAPTING	MAY COMO SAMECH INTERMI SOCIO	CASE , CASE NUMBER IF LONDS SEARCHED	USED INTERNALLY	DRLP OUTPUT PRINT INTREVAL	E(E) DESIC, MINIMUM PLOT INTERNAL	USA INTRAVALLY	,								
FLOATING 8	DENTIFICATION DE	9 (52)V	Q (92) D	1 _	1	i i	(05) 4		(6)3)	E (3)	CONTROL E(a)	€ (5)	1 1	E(1) DA	E/10 B	(A) (A)	_ا							0	
FORTRAN	PROGRAMMEN D		\ -	†	T	¥ .			1	,	\ -	1	-	1	*	•	\ -	1	-	1	-	1	1	•	
u.	NUMBER		+65600	0.000	0 4 4		+ 0 0	F - 10 0	2	0 0 7	Τ		T		1	40.00	0 0 7 48	-				8		\$ 1	FORM 114-0-16 (BONO)



	DECK NO.	ā	800	PROGRAMMER	2 3	DATE PAGE 6 of 17 JOB NO.	
l	NUMBER		-	0	IDENTIFICATION	DESCRIPTION DO NOT KEY PUNCH	UNITS
1	F = + 0	2000	V	1	INTEGRATION	F(1) AZA, MAX. INTECKATION ERROX, POSTCAPINE	Wa
1	+0.0	003		•	Course	F(2) TMESH, INITIAL INTERCATION STRIP SITE	5600 405
र	+0.0		•	١.	^	F(3) USED INTERNALLY	
2	+0.6		1	•	Ç	F(+) A3, MIN, INTRCKATION BKAGK	\$ \$
1	0 +	2		F		F(s) A5	\$ 4 COND \$
1	0 - 0		I	1		F(L)	9/10
	11 .	10000	•			F(7) AZ, MAXIMUM INTERATION ERROR	م//ه
	1.	2000	ļ ;	F	_	F(E) A 4, MIN, STEP SIZE BEFORE ENOTHER	SACOLAS
N	1		1	1			s/N
ā	1.	100	1	F		F(10) A4A, MIN. STRP SIEE AFTER CAPTURE	SACONOS
3			1.	Ŧ			
قا							
-	-	0001	<u> </u>		A CALLED VALUE OF BUILDING	AA (1) RE ACTI . THE FROM T.C. TO X-THOUST	SECONDS
	0 +		1		COUNTRY SYST	AA(L) THOMA,	DEIKEES
2	0 +	0	1		ſ	AA(3) PHCOMA " ROLL	
5		0	1-			AA(") PSCOMA " YAW	*
3	0 +	7	۲.	1		AA(S) ARXA, KATE GAIN, ROLL	Daybes bec
اقا	+ 0	1	1	╽.		↓ →	=
1-]	0 +	7	1.	1		A4(2)ARZA " YAW	5
2	+		T			A. ATTITUDE GAIN	DEC/086
য়		0	† -			=	н
5	+	0	1.	†		AA(W) A DPSA	•
3	0 +	0	1			AA(11) RADA, RADIUS TO JETS APPLED CS MONEY	, FT
زيو آ	+ 90	0.	1	•			787
ע	FORM 114-C-16 (BG	(BOMB) 9(1			

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DIGIT DECIMAL DATA

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FORTRAL FLOATING



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DENTIFICATION DESCRIPTION DO NOT		FORTRAN	NN FLOATING	8 DIGIT DECIMAL DATA	
10 10 10 10 10 10 10 10	OX XUSO	PROGRAM	IMER	PAGE 7 of 17	
+ 0 . 0 2 3 - ACTIVE VANICE 44(13) BURNA, MINIMUM JET BUKN TIARE + 0 . 43 - CONTOCK + 0 . 43 - ACTIVE TO BRANYA, ATTITUDE BOAD BAND, ASIL + 0 . 43 - ACTIVE TO BANNAA, ATTITUDE BOAD BAND, ASIL + 0 . 5 - ACTIVE TO BOAN TO BOAD BAND, ASIL + 0 . 5 - ACTIVE TO BOAN TO BOAD BAND, ASIL + 0 . 5 - ACTIVE TO BOAN TO BOAD BAND, ASIL + 0 . 5 - ACTIVE TO BOAN TO BOAD BAND, ASIL + 0 . 5 - ACTIVE TO BOAN TO BOAD BAND, ASIL + 0 . 5 - ACTIVE TO BOAN TO BOAD BOAD BAND, ASIL + 0 . 5 - ACTIVE TO BOAN TO BOAD BOAD BAND, ASIL + 0 . 6 B A B Y = 1 . 2 . ACTIVE TO BOAD + 1 . 2 . ACTIVE TO BOAD - 1 . 2 . ACT	NUMBER	٥	IDENTIFICATION		UNITS
+ 0 . 4 3	1		A PARTIE URBITED	MINIMUM JET BURN TIME	SECONOS
# 0. # 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 3 # 0. # 4 4 # 0. # 4 # 0. # 4 # 0. # 4 # 0. # 4 # 0. # 4 # 0. # 4 # 0. # 4 # 0. # 4 # 0. # 4 # 0. # 4 # 0. # 4 # 0. # 4 # 0. # 4 # 0. # 4	+0.0	1	38480	ATTITUDE DEAD BAND, ROLL	ORGARES
# 10 43 , yaw	+0+	1	# Svorie #	=	H
+ 1 . 6	+0+		γ -	14 11 11	Ŧ
+ 0.5 + 0.5 + 0.5 + 0.7 - 1.5 - 1.6 - 1.6 - 1.6 - 1.7 - 1.6 - 1.7 - 1.6 - 1.7 - 1.6 - 1.7 - 1.6 - 1.7 - 1.6 - 1.7 - 1.6 - 1.7	+0+		Т	AA (17) FXA IF 70 HOLDS ATTITUDE CAPTULE	N/D
+ 0.2 + 0.2 + 0.2 - 1 A(10) BANYA, " " " " " " " " " " " " " " " " " " "	4 1.0	1	173	TA, X-THRUST CUT-OPP APTRA CAPTURE	SRCONDS
+ 0.7 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	4	1		_	Deybestee
# 0.7 1	+			A (20) RANYA " PICH	,,
+ 10.0 - 1	+			., ., ., .,	
+ 10.0 - 13 AA(25) KMAXA, ATTITUDE EXCOC LIMIT, ROLL + 10.0 - 10.	+			INTERNALLY	
+ 10.0 -	40.0	1	¥	EKCOK LIMIT	
+ 0 . 0 -	4/0-	-		11 91	2
6 8 4 8 Y = 1. 2 2 RCS MONEY (S) OFFXA X-DST CG. TO & ACTIVE VANICLE CBABY (S) OFFXT TAKIET TAKIET TAKIET TAKIET X & BACK (SBABY (S) AJXF , ACTIVE VANICLE CBABY (S) AJXF , ACTIVE VANICLE CBABY (S) AJXF , ACTIVE VANICLE CBACK X & BACK & BACK CBADY (S) AJXF Z FROW (G) AJXF Z SACK CBADY (S) AJXF Z SACK		1		N 11	
68487 = 1.22 - RCS MONTHALLE GBABY (1) OFFXA, X-DIST, CL. To & ACTIVE WRINCLE -1.22 - RCS MONTHAL GBABY (2) OFFXT, 1. TARLET " TARLET " TARLET " GBABY (4) AJXF ACTIVE JET X-MONTHAL FROUT + b. 4 - ROS MONTHAL ACTIVE JET X-MONTHAL FROUT GBABY (4) AJXF " E SOUT FROUT - 75.	+ 1.0.	1	\		
6 8 4 8 Y = 1 . 2 2		 	T		
6 8 4 8 Y = 1. 2 2 RES MONTENT GRABY (1) OFFXA, X-DIST, CL. To 4 ACTIVE VRHICLE - 1. 2 2	E	•			
6 8 4 8 Y = 1. 2 2 AREITHER GBABY (1) OFFXA, X-DIST CL. To 4 ACTIVE VRHICLE - 1. 2 2 - 7 AREITHER GBABY (3) OFFKT TAREET TAREET TAREET TAREET BACK + 6. 4 - 7 5 BACK 6 8 4 8 Y (4) A 1 X B X BACK + 2 6. 4 - 7 5 E FROWT 6 8 4 8 Y (4) A 1 X B X BACK 6 8 4 8 Y (4) A 1 X B X BACK 6 8 4 8 Y (4) A 1 X B X BACK 6 8 4 8 Y (4) A 1 X B X BACK 6 8 4 8 Y (4) A 1 X B X BACK 6 8 4 8 Y (4) A 1 X B X BACK 6 8 4 8 Y (4) A 1 X B X BACK 6 8 4 8 Y (4) A 1 X B X BACK 6 8 4 8 Y (4) A 1 X B X BACK 6 8 4 8 Y (4) A 1 X B X BACK 6 8 4 8 Y (4) A 1 X B X BACK 6 8 4 8 Y (4) A 1 X B X BACK 6 8 4 8 Y (4) A 1 X B X X BACK 6 8 4 8 Y (4) A 1 X B X X X BACK 7 8 8 8 8 Y C X .		-	1.1		
6 8 4 8 Y = 1 . 2 2	10	-			
-2.9 -2.9 +6.4 +2.4.4 -7.5 , , , , , , , , , , , , , , , , , ,	684	22.12	* KEEK	X-DIST CG. To 4	
+ 6 . 4	27-1-		1	-[-
+26,4 - FRONT (S) AJZF Z SACK - 75.	- 2	1	~ 下	ACTIVE VALLEY X	٠
-75 13.	+ -	+			-
	<u>+</u>			100	_
	- 27-				

- 32 -



00 B	3	DESCRIPTION DO NOT KEY PUNCH	UNITS
ACS TONE	\$	GBABY (7) A JYF, ACTIVE JETY-MOMENT, FRONT GBABY (*) AJYB. " Y " BACK	L E
YES	् ः	TARERT Y Y	,
` : 1	₹	:	=
,	700	=	=
	š	GARBY (12) TUTB, 1. " & " , BACK	×
	7	CBACY(13) TJYF, " Y " FABUT	Ξ
	9	6848Y(14) 7JYB, " " BACK	3
113	8		
TACCE		AT (1) REACT I, TIME FROM T.C. TO X-THOUST	\$810NDS
		AT(2) RADIT, KDIST. TO RCS JETS FROM & LOND	FT
325		AT(3)RADTZ, Z-DIST, TO RCS JETS FROM CHAN	11.
F:		AT (4) FIRET, ACS JET THRUST	185
		AT (5) BURNT, MINIMUM BURN TIME	SACONDS
		ATCODARXT, RATE CAIN, ROLL	Departer
		AT(2)ARYT, " " PITCH	•
		AT(8) ARET, " " YAW	•
		AT(1) ADPHT, ATTITUM GAIN, ROLL	DRO/DRC
		, ,,	į
	8	AT(1,) ADPST " YAW	=
		AT(12) DBANXT, ATTITUDE DEND BAND ROLL	Devees

B DIGIT DECIMAL DATA

FORTRAIN FLOW NO



		FURTRAN	A	FLOATING	8 DIGIT DECIMAL DATA	
OFCK NO.		PROGRAMMER	IMME		DATE PAGE 9 of 17 JOB NO.	
NUMBER	5		-	DENTIFICATION	DESCRIPTION DO NOT KEY PUNCH	WITS
* · 0 +	2	-	F.	TARGET	AT (13) DBANYT, ATTITUDE DEAD BAND, PITCH	DEFRES
2 0 +	7.5	-	F	SA MICHA	AT(14) DBAN aT " YAW	z
3	,	F	F	certici	AT(15) TH COMT, ATTITUDE COMMAND, PITCH	2
1	0	-	F	POTEM POTEM		ε.
1	0	-	}	· V	AT(17) PS(OMT, " " YAW	11
0		-	-	/	ATLIS REACTT, TIME Y-THRUST CITOFF LAPTHE	540005
	9	•			AT (19) BANXT, RATE GAIN AFTER CAPTUR KOLL DESCIBELISE	DRU/DRUBEC
	-	-	Ŧ		AT(20) BANYT, " " " " ATEH	"
		-	Ŧ		AT(21) BANET, " " YAW	"
3	_	-	F		AT(22) DOI C.G. TO X-1875 , SOVUE	FT
		ļ.			: :	*
		•	1			=
-		-	1		AT(25) TMT. IF > 0 HOLDS ATTITUDE CATAME	NA
1	9	 	<u> </u>		F	DREARES
2 1	9	-	+		Y MAX T	11
3-	0	-	<u> </u>		ATCLE, PMXT " " " WA	=
9	6	•	F		AT(29) USED INTERNALLY	
4	0	-	-		1 1	
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8		-	<u> </u>			
5		-				
3		1	1			
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		3							•					ARGA												
	308 NO.	76 87	z	=		•		Ξ	=					MIFICE	"	;	"	"	"	1	پ				;	
YTA :		100												come.		!								!	1	
ר 1 ק	Ž	16.55.00		-	3	=	z	=	-					STANKE & COMP. WIFILE MAGA	"				1		1.					
CIMA	DO NOT KEY PUNCH	Ares)												37.00.			-	,								
	00	120				=		=	=	 				X 25.	×		*	ì	5	4	-					
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1	DESCRIPTION		(2)00	(3)	(4) Ø O	\odot	3	(2)	(e)	3	(9(10)			1 1	(2)55	\$1(3)	\$\$ (4)	(5) 55	\$5(6)	(7)	(8)	3	(6)			
Ø	3	3	g	3	2	(5) (3)	C (6)	(6)	(6)0)	CØ(6)	3	2		(1) 55	25	3	Š	SS	3	(5) (2)	55(8)	55	(01)55			ļ
FLOATING	NOL			ş										10.								•			•	•
00	DENTIFICATION		3	WIFICE AND	~									200	} :	1		بر		-	1		-			
	ER DEN			3		en Pe								£	£ :							,		,		·
RA	PROGRAMMER		1													•	_	-				-	-		-	
FORTRA	980	F	3	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	-	735-	6	2	-	<u> </u>		 -		-	<u> </u>			'		. !	- :	<u>-</u>	! . !			
			30	200			100	1 -	10					,							0		•		į	
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																				OF	P	00	RC	PA(UA	JO LM	H



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DECK NO.	PROGRAMMER	IMER	DATE PAGE // of // JOB NO.	
5	-	IDENTIFICATION	DESCRIPTION TO NOT KEY PUNCH	UNITS
, , , , , , ,	-		T(1) THROWN - (18) USTED INTERIMELY	
		- WITIAL	T(14) XP X-DIST FAM BASE TO KING ATMEN	FT
- 1		T Compition	, Y Y (ı
4	-		41	=
1,0	-		7(12)	
, 0	+		7(23),7(24) " "	
1 7	-	6	11 _	FT/SEC
2	1.	* Control +	TTEL THROUGH TIGS USES INTERNALLY	
7 .	+-	+	T(43) TIME IC MUST BE ZEKO	n/0
+ 0.0	+	-		
	•		AAR II OF Y-DIST FRM RING C.G. TO ATTAIN ATTAIN PLAN	FT
ADD 00	2	The second second	1	,11
+0.0	-	ſ	L	¥
+	+	ノ ネ	A DELA Y AND CHIDE CIME MASS	3 06
4 80 0	+	~ -	PACHENT OF	\$ we- FT
- اد	+		YYTR, " T	11
	-		A00(7) 33278, " " YAW	Ξ
+	-			
	10	— 下	ADDLY) A PRO, AMELE FAM +7 TO GUIDE ADLE #1	RADIANS
		7	ì	
1	- -	T		1,
1 0 0 0	+		1	٧
				ı
CON ST-D-TI MEGA				



_	DORIG ON MAIN	PROGRAMMER	#E.P.	DATE PAGE / 2 of 17 JOB NO.	
	BER	٥	IDENIFICATION	DESCRIPTION DO NOT KEY PUNCH	UNITS
	0 0 1		RIVECUOE	100(13) 125,2-015T, FRM RINK CL. TO 60108 PLANT	F F
2				ADD(14) BET ANGLE FAM K-AXIS TO CUIDE FACE RADIANS	RADIANS
R	7	1	***	ADD(15) TIPBET, AKIAL DIST. FROM RING TO GWORLAPAR	FT
15	- 0.0+			ADD (16) TID RO, COMPUTED INTERNALLY	
3	٠l			(LI) 00 PA	FT
اقا	+21800.			ADD(18) SK. EGI	18/FT
E				ADD (19) THEOLEH ADD(28) USED INTRANALLY	
3	16			ADD(29) SKL, ROUN SPRINT CONST. OF CUME & LATER	LB /FT
N.	- N			ADD (30) THEOLOH ADD (56) USAD INTERNALLY	
5	.1			ADD(S7) X PO, SAME AS XP	FT
1	- 0 0 * 2 / 1			ADD (BE) THROUGH ADD (70) NOT USED	
1	. 6			ADD(71) X L, ANIA, DIST. FRA GUIDE WRESSET TO LATER	FT
	-2.34			ADD(72) RADL, RABIUS TO LATCHES	FT
2			I	ADD(73) NOT USED	
2	1.50.0			ADD (74) STOPL, STOP TIME AFTER TOTAL LATCH	SECONDS
2	10			ADD (75) HYSA BURN HYSTERISIS, ACTIVE ITH.	
1	+0.007			r. 1	T.
5	+4*0.0			ADD(77) THEOLON ADD (80) NOT USEU	
1	6		A-7744/100	ADD (&) ATTENDATOR TENSION SAUGGER PORIS THERE	183
2	0			A00(92) " " "	11
N	000		\$ /\ \$	A DO (83) " "	2
2	9	,	^	AoD(#*)	=
\$]		<u> </u>		100 (15) TOTAL DI 10 PT	:
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90 - 12			PROGRAMMER
	·		ER D IDENTIFICATION DESCRIPTION DISCRIPTION DISCRIPTIO
	·		ER D IDENTIFICATION DESCRIPTION DO NOT KEY PUNCH - ATTENNATIVE ADD (92)
			ER D IDENTIFICATION DESCRIPTION DO NOT KEY PUNCH - ATTENNATOR ADD (91)
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ā	Z/EH-1.	-		TYPE CONTROL SYSTEM FOR TARKET SOYUR = 1 SAMO
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_	MPLOT-7.			PLOTS RYEKY "MALDT" IN TRURATIONS
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DIGIT DECIMAL DATA

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ASTP DOCKING PROGRAM INPUT DATA

The following pages list of the load analyses, computer input data. The input data describe the docking system characteristics, docking vehicle mass properties, and vehicle control system characteristics as used for Apollo CSM docking to the Soyuz.



A(2) A(4) A(5) A(4) A(7) A(7) A(10) A(10) A(10) A(10) A(10) A(10) B(2) A(10) A(

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10 DIGIT DECIMAL DATA DATE 8 of 1/5 JOB NO.	DESCRIPTION DO NOT KEY PUNCH	PITCH RATE GALM	23.0	ROLL ATTITUSE GAIN	PITCH ATTITUDE CAM DAG		TTI TUDE DRAD GAMO	Ъпсн "	(I+) DBANZT YAW	4`	ROLL	AT(17) PSCOMT, YAW ATTIME CAMPAIND (UTC)	AT (19) REACTT, TIME Y-THRUST CUTOFF AFTHE UMPRECOND	AT (19) BAUXT COLL MIT GAIN AFTIR CAPTURE LICHTHING		AT(21) BAYET, MAY MATE GAINARTER CAPTIME DECIMENTER	ATTIL DOT DOTTERON C.O. TO X JETS	DIST. FACAL C.C. TO Z. M.73	1004 C.6 TO YM/1	_	26) RMAXT ROLL ATTITUE FARDA LIMIT	AT (17) TMALL FILE A LIMBE & ARDA LIMIT (D66)	THE STATE OF			8 of 16)
AN FIXED	IDENTIFICATION	VEAICLE				4												41			*						
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DATE PAGE 9 of 15	DESCRIPTION	CO. ARKAY	(2)00	co(3)	(+)	CO(S)	ده(و)	(1)02	co(1)	Co (9)	Co(10)			SS, YKKYA	55(2)	\$5(1)	55(4)	55(5)	(1)55	ss(1) ·	\$3(0)	ss(a)	(0) 55			;
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- 11	DESCRIPTION	Y ARKAY	T(1) YA	T(3) ZA	7(9) XT	7(5)	1(6)		_		J		1111) Windows	۲.	ىلىر		T(19 THT		7/(1) PST.	9	730) YP			(42)1	
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FIXED 10 DIGIT DECIMAL DATA	IDENTIFICATION DESCRIPTION DO NOT KEY PUNCH	30.5	ADD (14) BET, ABLE FAM X.N.I. TO FINGE TIP.	ADD(16) TPRO, COMPLETED INTUMALLY	AONIS CHOP, ANAL CUT LEWIN ONST AF FINERS ANIK (K)	ADD (M) USED INTREMALLY	Abbito USED INTERMELY	ADD (C.) THRU ADD (75) USTID IN LANCE (10/10)	446(10) - (40) - CO2 ARAN NOT USED	3	Ab(90) (30)	11.7	MAN (61) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	A00 (54) ×	App (35) 1 App (3			ADD (5.1) 2.03@B - W - WANTELLY	THEY ADD (70) 55(2)	12 of 18
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DECIMAL DATA PAGE [3_of.](9 DO NOT KEY PUNCH	DIST FAM. FINER	(74) STOPL, STON TIME AFTER TOTAL LATER (SACTOR MILLER (SACTOR MAYSTRAISIS ACTIVE MAHICLE (SACTOR MAYSTRAISIS TAMBET MAHICLE (SACTOR)	ATTAUNTOR TENSION SAUBLIK	2 à	æ .			PK, Thriston Southblek,	
DATE DEC	ADD(71) KL, ANAL BIST FRM. FINITH RAVIE TO LATUI (FT. ADD (72) RADL, RADIUS TO LATCHAS ADD (73) NOT USFU	ADD (74) STOPL, S ADD (75) HYSA, I ADD (76) HYST, BU		ADD (73)	40 D (95)	410 (V) 400 (Ye)	(%) (%)	A 6 (92) ATT TO WATE A 6 (92)	Abb (95) Abb (95)
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FIXED	10 DIGIT DECIMAL DATA DATE D	DESCRIPTION DO NOT KEY PUNCH	OM (1) RETAKT MOTOR RATE LIMIT ISTRINT (MYEL)	m(t),	(1), "	" 6" " (4) " "	, , , , , , , , , , , , , , , , , , ,	" Z " (1) Wo	1 J " (8) Wd	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	" (o) " (o)) W d	Pm(11) "	PM (12) 4 12 4	4 (13), 4 (13)	, di , e , (4)	(J.) " (J				
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EXAMPLE JOB REQUEST FORM

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OUTPUT DATA

The output data from this program are in two forms: (1) numerical printout of docking loads and motion and (2) cathode-ray tube (CRT) plotted docking loads and motion time histories. The following pages are an example of printed and plotted program output and are followed by definitions of each data symbol and its units.

The user has <u>considerable responsibility</u> in controlling program output as described in the description column of the input data sheets. Integration step size, output printing, and plotting intervals, as well as the various program stop times, can all be specified in the input data by the user and will materially affect solution accuracy, output volume, computer run time, and resulting cost. A long run time and a small print interval will get you 50 to 100 pounds of printout paper, most of which you will not want.

Normal printed output for each case will look like the example: six pages of printed input data, and two pages at each time point during the run. The CRT data output will be approximately 50 pages of plotted time histories. If certain parameters remain zero throughout the run, their plots will not be included in the CRT.

PRINTED OUTPUT DATA NOMENCLATURE DEFINITION

Name	<u>Definition</u>	<u>Units</u>
TIME	Current time during docking dynamics	sec ·
CASE	Case number, 1.e., .60000000E01 = Case 6	N/A
XADD YADD ZADD	Acceleration vector of CSM WRT inertial frame	ft/sec ²
XTDD YTDD ZTDD	Acceleration vector of Soyuz WRT inertial frame	ft/sec ²
XAD YAD ZAD	Velocity vector of CSM WRT inertial frame	ft/sec
XTD YTD ZTD	Velocity vector of Soyuz WRT inertial frame	ft/sec

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Name	Definit <u>ion</u>	<u>Units</u>)
XA	Position vector of CSM C.G. WRT inertial frame	ft	
YA ZA			
XT YT ZT	Position vector of Soyuz C.G. WRT inertial frame	ft.	
OXA OYA	Angular rate of CSM about its body axis	deg/sec	
OZA	Angular rate of Soyuz about its body axis	deg/sec	
OXT OYT OZT	Angular rate of Soyuz about 100 0007 minus		
PHAD THAD PSAD	Angular Euler rate of CSM	deg/sec	
PHTD THTD PSTD	Angular Euler rate of Soyuz	deg/sec)
PHA THA	Euler angles of CSM	deg	
PSA PHT THT	Euler angles of Soyuz vehicle	deg	
PST FSAX	Force vector acting on CSM	1 b	
FSAY FSAZ	Referred to CSM body coordinate system	11.	
FSTX FSTY FSTZ	Force vector acting on Soyuz Referred to Soyuz body coordinate system	1b	
TSXA TSYA	Torque vector acting on CSM Referred to CSM body coordinate system	ft-lb	
TSZA	Torque vector acting on Soyuz	ft-1b	
TSXT TSYT TSZT	Referred to Soyuz body coordinate system		,
			•



Name	Definition	Units
FRX FRY	Force vector acting on ring Referred to ring coordinate system	1b .
FRZ		
TRX	Torque vector acting on ring	ft-lb
TRY TRZ	Referred to ring coordinate system	
		ft/sec ²
XRDD YRDD	Vector acceleration of ring Referred to inertial coordinate system	1L/Sec-
ZRDD	Referred to Therefal Cooldinate System	
ANXR	Angular rate vector of ring	deg/sec
ANYR	Referred to ring coordinate system	•
ANZR	•	
XRD	Velocity vector of ring	ft/sec
YRD	Referred to inertial coordinate system	
ZRD		
PHRD	Euler rate of ring	deg/sec
THRD		
PSRD		
XR	Position vector of ring	ft
YR	Referred to inertial coordinate system	
ZR		
PHR	Euler angle of ring	deg
THR		
PSR		
FCAX	Attitude control force vector of CSM	1Ъ
FCAY	Referred to CSM body coordinate system	
FCAZ		
FCTX	Attitude control force vector of Soyuz	1b .
FCTY	Referred to Soyuz body coordinate system	• •
FCTZ		
TCAX	Attitude control torque vector of CSM	ft-1b
TCAY	Referred to CSM body coordinate system	
TCAZ		·
TCTZ	Attitude control torque vector of Soyuz	ft-1b
TCTY	Referred to Soyuz body coordinate system	
TCTZ		



<u>Name</u>	<u>Definition</u>	Units)
RWRTA1 RWRTA2 RWRTA3	Position vector of geometric center of ring with respect to geometric center of attenuator attach plane	ft	
RWRTT1 RWRTT2 RWRTT3	Position vector of geometric center of ring with respect to geometric center of mating ring on Soyuz referred to Soyuz body coordinate system	ft	
VWRTA1 VWRTA2 VWRTA3	Velocity vector of geometric center of ring with respect to CSM coordinate system	ft-sec	
VWRTT1 VWRTT2 WRRTT3	Velocity vector of geometric center of ring with respect to Soyuz coordinate system	ft-sec	
AWRTA1 AWRTA2 AWRTA3	Euler attitude of ring with respect to CSM	deg	
AWRTTL AWRTT2 AWRTT3	Euler attitude of ring with respect to Soyuz	deg)
OWRTA1 OWRTA2 OWRTA3	Angular rate of ring with respect to CSM	deg-sec	
OWRTT1 OWRTT2 OWRTT3	Angular rate of ring with respect to Soyuz	deg-sec	
ATTNX(I) ATTNY(I) ATTNZ(I)	X-Y-Z components of vector length of six attenuators with respect to active body coordinate system	ft	
ATTN(I)	Absolute length of the six attenuators		
STR(I)	Axial stroke of attenuators (+compressive)	ft	
ATTND(I)	Attenuator stroking velocity (+compressive)	ft-sec	
FA(I)	Axial force in attenuators (+compressive)	1b	
FINGER-R	Distance from ring base along guide edge to point of load application - CSM side	ft)
FFTX FFTY FFTZ	Guide force components, guide-axis system on Soyuz	1ь	,



Name	<u>Definition</u>	Units
FFRZ FFRY FFRZ	Guide force components, ring axis system on CSM	1b
DIS-1	Distance to contact normal to CSM system guide edge, (-) is in contact	ft
FINGER-T	Distance from ring base along guide edge to point of load application - Soyuz side	ft
ANGLE-R	Angle from +Y Axis to point of contact around the CSM system ring	deg
RFTX RFTY RFTZ	Ring force on Soyuz guide, guide axis system on Soyuz	1 b
RFRX RFRY RFRZ	Ring force on CSM ring, in ring axis system	1ь
DIS-2	Distance to contact normal to CSM ring edge (-) is in contact	ft
ANGLE-T	Angle from +Y axis to point of contact around the Soyuz ring	deg
FINGER-A	Distance from ring base along guide edge to point of load application - CSM side	ft
FRTX FRTY FRTZ	Force on Soyuz ring, in the Soyuz axis system	1ь
FRRX FRRY FRRZ	Force on CSM guides, in the axis system of the CSM ring	1ь
FRRX1 FRRX2 FRRX3 FRRX4 FRRX5 FRRX6	Force on the Soyuz ring surface number 1, 2, 3, etc. in compression (-)	1b
DIS-3	Distance to contact normal to the CSM guide edge (-) is in contact	ft



Name	Definition	Units
DELTAL	 (-) distance capture latch would penetrate latching surface if not loaded, (+) no contact 	ft
LATCHL	(-) distance along 45-degree latching surface (+) no contact	ft
LATCH LOADS BEARING	Capture latch loads in bearing on a surface that is 45-degree off the target vehicle X axis between target guides	1 b
FRR, TRR	Guide ring loads, ring-to-ring contact	1b



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OUTPUT -0.1000E+01 -0.9990E-74 0.1071E+01 0.2303E-68 0UTPUT -0.2000E+01 -0.1000E+01 0.1741E+01 0.1071E+01 0UTPUT 0.5978E+00 -0.2000E+01 -0.9142E-01 0.1741E+01 0UTPUT 0.4682E+00 0.5978E+00 0.4044E-03 -0.9142E-01

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0.0	0.0	0.0	0.000002E-78	0.325000E+30	0.234000E+01
0.0	0.0	0.700000E-02	0.100000E-02	0.0	0.0
0.0	0.0	0.0	0.400000E+02	0.320000E+06	0.0
0.0	0.0	0.0	0.0	0.0	0.0
3.3	0.100000E-02	0.999000E+00	0.0	0.0	0.0
0.0	0.0	0.0	0.0		



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	SYSTEM
-	ASTP
SNOI	DOCK ING.
TAL CONDIT	NO.2. ORBITER DOCKING.
	NO.2
***	CASE

ACTIVE VEHICLE

0.49999981E+01 -0.24525162E+02 -0.73886261E+02 0.85600000F+06 0.83000004E-01	
THA XA 24 221A OFFJA	
-0.99999982E+00 0.50000000E+00 -0.10309002E+00 0.57380000E+07	כונ
OMEGVA KAO Zad Yvia Yzia	TARGET VEHICLE
0.0 -0.15698924E-05 -0.16599935E+00 -0.25199997E+00 0.25199997E+00	TAR
PHA PSA YA XXXIA RA IA	
-0.69476D22E-10 0.31517163E-06 -0.313978B2E-07 0.7370000E+04 0.9999993E-03 0.37800003E+02	
ONEGXA ONEGZA YAD XMA XVI A UFFKA	;

C-ARRAY/ ATTENUATOR DATA

0.0 0.68650000E+07 -0.25199997E+00 -0.94700003E+01

THT XXII XZIT RT

0.0 0.73700000E+04 0.9999993E-03 -0.37800003F+02

OMEGYT XMT XYIT OFFKT

0.0 3.0 0.85600000E+06 -0.83000004E-01

PHT PST 2211 OFFJT

0.0 0.0 0.67380000E+07 0.20000001E-02

OMEGZT VVIT

	0.0 0.0 0.391000E+00 0.213500E+01 0.196350E+00 0.0 0.0
	0.100000E+01 0.780000E-03 0.0 0.122718E+01 0.0 0.500000E+01
NO ATTENUATORS = 6	-0.300000E+02 0.176700E+01 0.125000E+01 0.883700E-04 0.0 0.900000E+02
4 ON	0.274000E+01 0.978000E+05 0.0 0.0 0.449500E-01 0.0 0.0
	0.239000E+01 -0.650000E+01 0.0 0.122797E+01 0.0 0.0 0.0 0.0
	0.000003E-78 0.300000E+02 0.0 0.90000E+02 0.120000E+00 0.0 0.0 0.0

0.10000002E-0	A5 A7	0.0 0.29999996E-03	50 A3 05 A4	50 0.9999997E-05	0.2999996E-03 N 0 A2	TNE SH 0.29999966-03 Kal
-1	:	DATA	INTEGRATION DATA			
0.0	CASE	0.0 0.72727241E-02	31 DELPP 00 DESLC).8000000E+JI 0.1899999E+00	1 STOP 1 DELP 15	IPHASE IGRAPH MPLOT
		SONI	PRUGRAM COMMANDS			
•	-0.310181E+00 -0.272239E+01	-0.251274E+01 0.109257E+01			0.1092576+31	0.310183E+00 -0.272239E+01
	-0.119500E+01 -0.206980E+01	-0.239000E+01	•	· .	3.239000F+01 0.0	0.119530E+01 -0.206980E+01
	0.240000E+03	0.180000E+03 0.156500E+03			0.0 0.235000E+02	-0.600000E+02
0.600000E+00 0.0		1 0.100000E+01 0.0	0.254000E+01 0.0	0.254000E+01 0.0	-0.358000E+00 0.273000E-03	0.100000E+03 0.656000E+04
0.234000E+06		•	0-0 0-198200E+00	0.0	0.750000E+01 -0.723700E+76	0.750000E+01 3.0
0.750000E+01	0.750	0.0	0.0	-0.508360F+00	0.377703E-06	0.786921E+00

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SYSTE	
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0.69999998E+00 0.10000000E+01 0.22999998E-01 0.10000000E+01 0.6999999E+00		0.2299998E-01 0.10000000E+01 0.4300001E+00 0.0 0.0
ARXA ADTHA BRA TNA BANZA PMAXA		BRT ADPHT OBANYT PSCOMT BANZT TML
-0.15698934E-05 0.10000000E+01 0.43000001E+00 0.6999999E+00 0.6999999E+00	SVSTEM	0.9000000E+03 0.6999999E+00 0.4300001E+00 0.0 0.0 0.0
PSCOMA ADPHA FRBA OBBNZA BANVA VMAKA	TARGET CONTROL SYSTEM	FIRET AR2T DBANXT PHCOMT BANYT DG3
0.0 0.699999998E+00 0.43000001E+00 0.69999999E+00 0.13000399E+32	TARGET	0.0 0.69999999E+00 0.10000000E+01 0.0 0.0 0.10000000E+02
PHCOMA ARZA ARZA BBOA BBANYA BANXA RMAXA		RDTZ ARVT ADPST THCOMT BANXT DQZ
0.5000000E+01 0.6999999E+00 0.43000000E+00 0.50000000E+00 0.50000000E+00		0.0 0.6999999E+00 0.10000000E+01 0.430000001E+00 0.50000000E+00 0.0
THEORIA ARYA ADPSA OBANXA REACTA IR	:	RADTY ARXT ADTHT DBANZT REACTT D001

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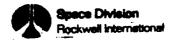
	0.900000E+02	THTOT	0.5000000E+01	THVEL	0E+01 THVEL 0.9000000E+02	VELLAT	-0-1000001-0-
XMEGR C	0.0 0.50000000E+00	THORO	-0.10000000E+01	THOMEG	0.9000000E+02	VAXIAL	0-50000006+00
			STROKE VS		AREA TABLE		
			-0.10000000E+01	•	6.31480001E+00		
					0.1100001E+00		
			0.35000000E+01		0.34.000000E-02		
			0.40000000E+01		0.18499996-02		
i			0.43000002E+01		0.1080001E-02		
			0.45000000E+01		0.69999998E-03		
			0.12000000E+02		0.69999998E-03		
			ATTENUATOR		SPRING LOAD TABLE		
			1.0	••	0.0		
			0.10319999E-02		0.22500000E+02		
			0.46799999E+00		0.31500000E+02		
			0.6760000E+0		2-30250000E+03		
οī			0.75000000E+00		0.160000006+05		
ugin Po			RETURN	ORIFICE	RETURN DRIFICE AREA TABLE		
ΑL			-0-10000000E+01		0.19999996-02		
P			0.0		0.19999999E-02		
AC			0.13010110000060000000000000000000000000		0.19949996-02		
E			0.1200000E+02		0.1999999E-02		

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BD 74-CS-0023



ZTDD 0.0 ZT 0.0 DZT 0.0 DZT 0.0 PST 0.0 PST 0.0 1527 0.0 15	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
THP 0.0 VID 0.0 VI 0.0 DVI 0.0 THT 0.0 THT 0.0 THR 0.0 TRY	0.0 0.0 0.0 0.0 0.0 0.1 0.0 0.0
E XTDD 0.0 YTDD 0.0 YWRTAB 0.0 YW	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.142438E-12 0.100000E+02 0.315172E-06 0.315172E-06 0.315172E-06 0.315172E-06 0.120598E-01 0.149492E+07 0.149462E+07 149645E-07 149645E-07 149645E-07 149645E-07 149645E-07 149645E-07 149645E-07 149645E-07 149645E-07 149665E-06 0.1007564E 0.1007564E	
1370574E-14 313979E-07 170000E+01 100000E+01 221472E-10 221472E-10 221472E-10 137219E-11 13721	A D D D D D D D D D D D D D D D D D D D
PHASE YADD YADD THAD THAD THAD THAD TESAY TESAY TCA	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
	FINGER-R FORCE-FFX FORCE-FFX FORCE-FFY FORCE-F

,	•			0-0	0.0	0.0
FINGER-T	0.0			0.0	0.0	0.0
FORCE-RFTX	0.0	2			0.0	0.0
FORCE-RFRX	0.0					0.0
	0.0			0.0		0.0
	0.0				0.0	0.0
_	0.0	0.0				0.0
FORCE-RFRZ	O.O	D. 1481057E+01	6-1481057E+61	5.10595136+01	378723E-03	0.5359650E-03
2-510	PETEREN FINGES ON	RING AND	TARGET AING			•
			0.0	0.0	0.0	0.0
FTERDE		0.0	0.0	0.0	0.0	
T T T T T T T T T T T T T T T T T T T		, 0.0	0.0	0.0	0.0	
A		0.00	0.0	0.0	0.0	0.0
TORCE TANK			0.0	0.0	0.0	0.0
FORCE-PRIV				0.0	0.0	0.0
FUNCE-FUNT	0.0		0.0	0.0	0.0	0.0
FORCE -FRIZ				0-0	0.0	0.0
FORCE-FAB.	0.0	2.5				
AIRG TO RIR	RING TO RING CONTACT LOADS		•	0 0	Coc See Se	FPRX6 3.0
FRREI 0.0	FRRX2 0.0	.O FRRX3	3.3	TAXA COOK A COOK	0013	0.83826428+00
1	0.5407391E+60	0.5407391E+00 0.5407410E+00	0.8382673E+00	00446710616-00		
I	DISTANCE AND FORCES	DACES				
;	0.30965716+00	0.6303748F+00	0.6303695E+00			
LATCH	0.T019331E+01		0.26618818+00			
LATCH LOADS			(
BEARING	0.0	0.0	0.0			
IHIT FAS.TRR 0.0 FAS.TRR 0.0 0.336179666-11 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	CTION FORCE ON RING EXCION-000 MAX ATTNEUATOR FORCES FE-11 0.0 12353038E-08 0.0 0.5934701E-01 0.22117 FINGER DISTANCE FROM 15+00 0.554657492E+01-0.1 E+00 0.54667492E+01-0.1	INIT **********************************	0 0.0 0.0 0.0 0.90 0.90 0.90 0.90 0.90	000 MIN ATTENUAATOR FORCES ***** 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 e-0.0 0.2357339E+00 E+01-0.24305954 0.0	0.0 0.0 10.7

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00xxxxx21222	2 :		
2100 0.834404E-02 210 0.310739E-03 21 0.737331E-05 027 0.861971E-05 PST 0.15297E-06 FST2 0.614956E+02 FST2 0.346214E+01 TRZ 0.751476E-01 ANZR-0.125338E-02	0.0	100000	700 700 700
0 0 2 4	TCTZ 0.0	0.1582443E+01 0.8848175E+00 -0.6541138E+00 0.17127465E-01 0.7712746E-03	0.0 0.0 0.0 0.0 0.0 0.0 0.9 1.5417369E+00
		00.00 00	000000000000000000000000000000000000000
70 0 > 1 4 6	THR 0.462856E401 FCTY 0.0 TCTY 0.0 00 01 01 03	1227488E+00 1091040E+01 192506E+01 192506E+01 5001965E-01 3502519E+02	0.0 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.1158279E+33
	06 THR FCT 7E-02 7E-02 4E+00 3E-01 9E-01 5E-04 7E-02		
	0.366412E-06 TM 10.0 FC 10.15411377E-02 10.62194824E+00 1-0.58733943E-01 10.1569899E-01 10.1569899E-01 10.1569899E-01 10.1569899E-01 10.1569899E-01 10.0380455E-02		0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.1 0.0
	2 PHR FCTX 3 TCTX RWRTA3 VWRTA3 VWRTTA3 AWRTA3 OWRTA3		
11 2ADD-0.444473E-02 2AD-0.103016E+03 2A -0.739063E+02 0ZA 0.20225F-02 PSAD 3.232925E-32 PSAD 0.201016E-03 FSAZ 0.38423E+02 FSAZ 0.38423E+02 TSAZ 3.38423E+02 TSAZ 3.38423E+02	# # 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 +	736 936 946 806 826	ET FINGERS 0.0 0.0 0.0 0.0 0.0 0.1 0.9 0.9186038E+00
671 0.444473E-01 0.10)316E+01 0.20225F-01 0.201016E-01 0.384423E+01 0.384423E+01 0.384428E+01 0.387548E+01 0.178054E+01	1 2R -0.371727E+0. FCAZ 0.0 FCAZ 0.0 -0.57220459E-05 -0.33497810E-04 -0.75902790E-05 0.3764266E-03 -0.22607923E-02 0.64538836E-01	0.156	6657 F
·	17 A Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	946+01 846+01 666+01 026+01 036-02 956-01	AND TAI 0.09E+00
ASE 0-0.305173E-05 0-0.185813E-05 -0.165999E+00 A -0.691086E+00 An-0.691086E+00 An-0.224683E+00 AY-0.224683E+00 YA-1.217681E+04 YA-0.217681E+04 YA-0.217681E+04 YA-0.217681E+04	0.829667E-01 0.0 0.182520E-06 0.182520E-06 0.182520E-06 0.11 VWRTTZ - 0.11 VWPTTZ - 0.12 VWPTTZ - 0.13 VWPTTZ - 0.14 AWRTTZ -	MEDDAGE 4	FINGERS AND TARGET 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0
			_
PHASE YADD-0 YAD -0 OVA -0 OVA -0 THAD-1 THAD-1 TESAY-0 FRY YADD O	★★########	4400000	z 5 z
0.200132E+00 1.494741E-02 1.494741E+02 0.244251E+02 0.143337E-03 0.173384E-04 0.073584E-04 0.073584E-04 0.073584E-04 0.073584E-04 0.073584E-04 0.073584E-04		0.158244 0.158244 -0.884823 -0.654111 0.192740 -0.815558	7.00 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.200132E+00 0.93464E=03 0.244251E+00 0.244251E+00 0.143332E-03 0.173584E-0 0.173584E-0 0.173584E-0 0.173584E-0 0.173584E-0 0.173584E-0	• •		
TIME 0.200132E+00 XADD-0.934641E-02 XAD 0.499273E+02 XA -0.244251E+02 DVA 0.143332E-03 PHAD 0.172324E-03 PHA 0.173584E-04 FSAK-0.658797E+02 TSAK 0.101286E-01 RXX 0.011286E-01 XRDD-0.87530E-01	100464444	ATTNXCI ATTNZCI ATTNCCI ATTNCCI STRCCI	FINGER-F FORCE-FFTX FORCE-FFTY FORCE-FFTY FORCE-FFTY FORCE-FFTY FORCE-FFTY FORCE-FFTY FORCE-FFTY FORCE-FFTY FINGER-T FINGER-T FINGER-T

				(0043081108	0.8821301F+00
FINGER-T	0.0	0.0	0.0	0.0	0.1001110000	0 44911545+02
		0.0	0.0			70.307176440
PURCE-RTIX			0.0			-0.3263797E+02
FOACE-RFRX	0.0	0.0			0.2574677E+31	0.2606033E+01
FORCE-RFTY	0.0	0.0	0.0			-0.1635968F+02
EDRCE-RERY	0-0	3. 0	0.0	0.0		14369776402
		0.0	0.0			10.10303403
			0.0		-0.3339238E+0Z	-0.336020VE+02
TOTAL STATE	107774GAE+01	0.14996146+31	3.149963TE+01	0.10773946+01	-0.2986908E-02	-0.3025055-04
013-2	ONE SUITE TOTAL CONTROL OF THE PROPERTY OF THE	ON BING AND	TARGET RING			,
TALENDA PROPERTY	DEINCEN FINGE			0.0	0.0	0.0
ANGLET			0.0	0.0	0.0	0.0
FINGER-A	0.0			0.0	0.0	0.0
FORCE-FRTX	0.0	·	•		0.0	0.0
たむをた 医一斤をため	0.0	0.0			0.0	0.0
FORCE-FATY	0.0	0.0	0*0			
FORCE-FRRY	0.0	0.0		0.0		
COOCE ENT?		0.0	0.0	0.0	9.0	
FORCE - COD 2		0	0.0	. 0.0	0.0	0.0
PURCE-TRRE	2000					
KING TO KIN	CONTRACTOR STATE CONTRACTOR STATES			F8FX4 0.0	FRRXS 0.0	FRRX6 0.0
FREXT 0.0	Dec Skapp	226363		A BEAKOKOF +00 0.1012157E+01	0.1012206E+01	0.8567799E+00
	0.5186033E+00	04-3167-516+00	200000000000000000000000000000000000000			
**** LATCH	DISTANCE AND FORCES	ACES	000			
DEL TAL	0.2947301E+00	0.6475390E+00	0.04747600	•		!
LATCH	0.1037403E+0L	0.26715326+00	0.26720825+00			
I ATCH LOADS			(
BEARING	0.0	0.0	0.0			
IMIT FRE-INTER 60-70763540 -0-21367035 6000 TARGE 0-23469898 1AI-111	CTICN FORCE ON -0.6486998E+02 MAX ATTNEUATOR E+01 0.35024994 E+01-0.61217775 0.5934701E-01 T FINGER DISTAN 1E+00 0.59412613 -0.1065140E+00	O 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 -0.6719447E+02 -0.6719447E+02 -0.671946520 -0.00 -0.	0.2 +72 +72 +00 +00	E 0.2821629F-75 -0.1201606E+03 0.3 AATOR FORCES **** E+72 7.35025192E+02 7.71555147E+01 0.5934701E-01 0.2357339E+00 0.0 E+00 0.59058228E+01-0.24503927E+01 0.00	0.1201606E+03 0.3532715E+00 +02 3.71555147E+01 +01-0.58463106E+01 0.2357339E+00 0.0 +01-0.24503927E+01 0.0



:							•	•			
AL TIME	73 72 2	000	0.0 0.0 0.2833921E+00	0.0 0.3202763E+00 0.3242620E+00	000	0.1506202E+D0 0.0 0.0	000	0.0 0.3242620E+00 0.1433451E+00	0.2463643E+00 0.1433491E+00 0.3056847E+00	0.0 0.3242620E+00 3.3	0.0
MINIMUM VALUE	0.4981481E+00 -0.6379736E-05 -0.1005765E+00	000	-0.1404133E+00 0.4698527E-07 -0.1027970E+00	-0.2452516E+02 -0.1659999E+00 -0.7391870E+02	000	-0.1023176E+02 -0.8299977E-01 -0.3719328E+02	-0.6947602E-10 -0.999998E+00 0.3151716E-06	0.0 -0.2118043E-02 -0.3663952E-36	-0.1237685E-02 -0.1032049E+01 -0.2533917E-02	0.0 0.4756840E+01 -0.1569892E-05	0.0
AT TIME	0.0 0.0 0.1433451E+00	0.3242620E+00 0.3242620E+00 0.3242620E+00	0.3242620E+00 0.2982539E+00 0.0	0.3242620E+00 0.0 0.0	0.3242620E+00 0.3242620E+00 0.3242620E+00	0.0 0.3242620E+00 0.2094209E+00	0.3242620E+00 0.3242620E+00 0.3242620E+00	0.3242620E+00 0.0 0.2833921E+00	0.2168096E+00 0.2610994E+00 0.3242623E+00	0.3242620E+00 0.0 0.3242623E+33	0.3242620E+00
MAXIMUM VALUE	0.5000000E+00 -0.3139788E-07 -0.9988260E-01	0.1274545E-02 0.5267813E-05 0.1114971E-02	0.1232632E+00 0.5667065E-03 0.1496453E+00	-0.2436324E+02 -0.1659994E+00 -0.7388626E+32	0.1175433E-03 0.3806531E-06 0.1028258E-03	-0.102155E+02 -0.8291286E-01 -0.3717259E+02	0.5700468E-05 -0.5006242E+00 3.3286447E-)2	0.6307793E-05 0.0 0.2318664E-34	0.3623242E-02 -0.2775496E-01 3.7655579E-72	0.4535296E-04 0.4999998E+01 0.5323325E-33	0.3421204E-06

	//sec //sec //sec	7/SEC 7/SEC 7/SEC	T/SEC T/SEC T/SEC	Ĺ			DEG/SEC DEG/SEC DEG/SEC	0EG/SEC 0EG/SEC 0EG/SEC	DEG/SEC DEG/SEC DEG/SEC	96.0 96.0 96.0	930
w	77	F F F F	TET	<u> </u>		F 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Z X X	7 X Z	X X X	500	٥
AR 1 ABL	XAD YAD ZAD	XT0 YT0 2T0	X X X X X X X X X X X X X X X X X X X	Z X X	***	X X X X	0 4 6 0 0 4 6 0 0 0 0 0 0 0 0 0 0 0 0 0	OMEG	OMEG	PHA THA PSA	PHT

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THT DFG		0.0	-).1953215E-03	3.3242620E+00
PST 0EG	0.25545496-05	0.3242620E400	90-3686 1 169-0-	
	0.2102508E-03	0.3242620E+00	-0.3614572E-05	0.8220649E-01
		0.0	0.4785947E+31	0.3242620E+00
TAK DEG		0.3242620E+00	-0.2691184E-05	0.3033599E-01
		. 0. 0	-0.8649184E+02	0.2315889E+00
2			-0-4157391E+03	0.3242620E+00
		O KB22347E-01	-0.4260629E+02	0.3202763E+00
-	0.10557355402	10 71663706.00		• •
	0.7298570F+02	0.2094209E+00	0.0	0.0
	0.4147446400	0-3232763E+00	0.0	0.0
FSCHIY LBS	0.6384851E+02	0.2094209E+00	0.0	0.0
7 14064				(
•	0.32289635+02	0.30335996-01	-0.1739658E-08	0.0
ABOUT AROUND	0.13673636+00	0.2759612E+00	-0.9368563E-01	0.2369756E+50
	0.49140016+01	0.29825396+00	-0.3410689E+02	0.23158645 +00
2			00.3603.030	
TCHAKE FT LBS	0.1221\$91E+02	0.3242620E +00	-0-346340-0-	0.2215866600
4	0.0	0.0	*C*3C*14*CC**C-	00-373674234
TSUMAZ FT LBS	0.5966980€+01	0.2315869E+00	-0.404041ZE+00	10-30663306-0
		0.32027636+00	-0.9289616E-01	0.1946436E+00
ı	0.16341905.02		-3-1935094E+34	0.2094219E+00
TSUMTY FT LAS	0.0	0.2094209E+00	-0.1566190E+01	0.3202763E+00
_				
Ţ	0.2223482E+00	0.3129805E+00	-0.1 754160E+00	0.23158696+00
	0.13677986+02	0.2168096E+00	-3.1119849E+32	0.2685303E+00
TSUMP FIT LBS	0.3202000E+00	0.3129805E+00	-0.1520557E+00	0.14334516+00
,	10136101 0	0.1013599F-01	-0.6893835E+01	0.2168096E+00
لــ	40-100000000000000000000000000000000000	0-33599F-01	-0.11155356-03	0.21680966+00
STROKE ATTEN 1 FT	0.8215103E-02	0.2241983E+00	-0.7670127E-02	0.2463643E+00
•			10434040404	0.48223476-01
EDDE ATTEN 2 185	0.3528505E+02	0.3242620E+00	10-364600000	10 317777770
	0.13667445-01	0.3242620E+00	-0.98231235-0-	10-3166.3386.0
VELDCITY ATTEN 2 FI/SEC	0.1192064E+00	0.2759612F+00	-0.9522609E-02	10-206176+4*0
		0.32619836+00	-0-1848469E+01	0.3056847E+00
_	0.1883248E4.0	0.2241983E+00	-0.2990279E-34	0.3056847E+00
	CO-34 PG 27 CO-CO-CO-CO-CO-CO-CO-CO-CO-CO-CO-CO-CO-C	0.14334576+00	-0.1518557E-01	0.2537529E+00
VELOCITY ATTEN 3 FT/SEC	10-36426-01			

ORIGINAL PAGE OF POOR QUALITY



				,
FORCE TARGET FINGER-RING 4-6).) 0.5110207E+02 0.5158023E+02	0.0 0.2094209E+00 0.2094209E+00	000	000
ACTIVE INTERFACE TORQUES,FT LBS	3.1751614E+00 0.3403076E+01 0.7061529E+00	0.2315869E+00 0.9299755E-01 0.2908230E+00	-3.2255294E+00 -0.1378320E+03 -0.8462715E-01	0.3129805E+00 0.2168096E+00 0.8220649E-01
TARGET INTERFACE TORQUES, FT LBS	0.) 0.2191206E+03 0.0	0.0 0.2094209E+00 0.0	-0.3165951E+00 0.0 -0.1059144E+01	0.3202763E+00 0.0 0.3202763E+00
ARGET FINGER INTERFERENCE DISTANCE	0.6471348E+33 0.4086068E+00 -0.2319756E+00	0.1651945E+00 0.1579114E+00 0.9299755E-01	0.3986807E+00 -0.2345877E+00	0.0 0.0 0.2094209E+00
THOTOR FT LBS	0.0	0.0	0.0	0.0
GRAPHING TIME = 0.7189996E+01 SECONDS	ECONDS	KNT= 35		

- 84 -

80 74-CS-0023

)

ASP JOB NO. * 0326 10(DAY TIME) * (004 16.01.12) DATE # 74.004

77101N0184 JOB (MOUNT G BI 6964074138743133 201 004 3900605 ".

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ELAPSED TIME ON MAIN = 1651 = 012.85, START TIME = 20.07.34

DDNAME = SYSMSG PRINTED ON RHOOIPRI, LINES = 000164

DDNAME = SYSPRINT PRINTED ON RHOOIP , LINES = 00000

DDNAME = FIGEFORI PRINTED ON RHOOIPRI, LINES = 001297

LINES OUTPUT FOR THIS JUB = 002068

NO CARD GUTPUT FOR THIS JOB.



PLOTTED OUTPUT DATA NOMENCLATURE

Name	<u>Definition</u>	Page	
XAD	Inertial velocity, active vehicle C.G.	6	
YAD	in the X, Y, and Z directions of the		
ZAD	inertial frame		
<u> ZAD</u>		_	
XTD	Inertial velocity, target vehicle C.G.,	7	
YTD	in the X, Y, and Z directions of the		
ZTD	inertial frame		
		0	
XIRD	Inertial velocity, guide ring C.G., in the	8	
YRD	X, Y, and Z directions of the inertial frame		
ZRD			
		9	
XA	Position of the active vehicle C.G.	,	
YA	respect to the inertial frame located		
ZA	initially at the target vehicle C.G.		
	a set of the semant mobile to C	10	
XT	Position of the target vehicle C.G., with respect to the inertial frame located		
YT	initially at the target vehicle C.G.		
ZT	initially at the target vehicle off.		
	Position of the guide ring C.G., with respect	11)
XR	to the inertial frame located initially		
YR	at the target vehicle C.G.		
ZR	at the target valled over		
OMEGXA	Angular rate of the active vehicle about its	12	
OMEGYA	X, Y, and Z body axes		
OMEGZA			
0.200.		1.3	
OMEGXT	Angular rate of the target vehicle about	13	
OMEGYT	its X, Y, and Z body axes		
OMEGZT			
0.400	Angular rate of the guide ring about its	14	
OMEGXR	X, Y, and Z body axes		
OMEGYR OMEGZB	A, I, and a body was		
OMEGZR			
PHA	Euler angles of the active vehicle about the	15	
THA	X, Y, and Z axes respectively, i.e., phi,		
PSA	theta, and psi		
nue	Euler angles of the target vehicle about the	16	
PHT	X, Y, and Z axes respectively		
THT PST	n, 1, and 2 and took 1		
r51			
PHR	Euler angles of the guide ring about the	17	
THR	X, Y, and Z axes respectively		,
PSR	•		}
		18	
FSUNAX	Total force at the active vehicle C.G in its	10	
FSUMAY	X, Y, and Z body axes; includes RCS forces		
FSUMAZ	- 86 -		
	- 00 -		



Name	Definition	Page
FSUMTX FSUMTY FSUMTZ	Total forces at the target vehicle C.G. in its X, Y, and Z body axes; includes RCS forces	19
FSUMRX FSUMRY FSUMRZ	Total forces at the guide ring C.G. in its X, Y, and Z body axes	20
TSUMAX TSUMAY TSUMAZ	Total moments about the active vehicle C.G. in its X, Y, and Z body axes, includes RCS moments	21
TSUMTX TSUMTY TSUMTZ	Total moments about the target vehicle C.G. in its X, Y, and Z body axes, includes RCS moments	22
TSUMRX TSUMRY TSUMRZ	Total moments about the guide ring C.G. in its X, Y, and Z body axes	23
RCS FORCE & MOMENTS, ACTIVE VEHICLE	Time durations of active vehicle RCS forces and moments in its X, Y, and Z body axes	24
RCS FORCE & MOMENTS TARGET VEHICLE	Time duration of target vehicle RCS forces and moments in its X, Y, and Z body axes	25
FORCE ATTN 1 STROKE ATTN 1 VELOCITY ATTN 1	Axial force, stroke, and stroke rate of attenuator (shock absorber) No. 1	26
SAME FOR ATT	ENUATORS NO. 2 THROUGH NO.6	27 - 31
RWTTA X Y Z	Guide ring position with respect to the active vehicle docking interface structural base center line	32
AWRTA X Y Z	Guide ring relative angle about the active vehicle interface base X, Y, and Z axes	33
VWRTA X Y Z	Guide ring relative velocity with respect to the active vehicle interface X, Y, and Z axes	34
OWRTA X Y Z	Guide ring relative angular rate about the active vehicle interface base X, Y, and Z axes	35

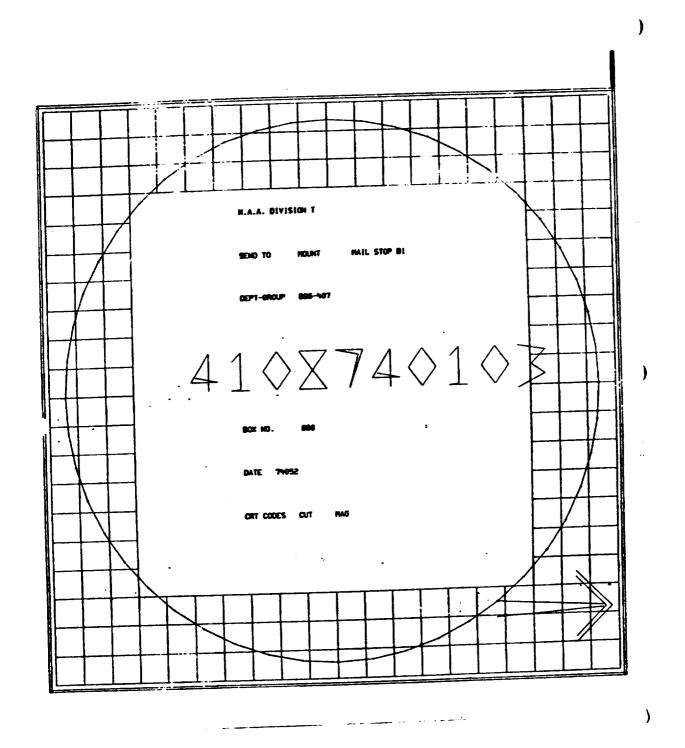


Name	Definition	Page
RWRTT	Guide ring position with respect to the target vehicle docking interface structural base center line	36
AWRTT	Guide ring relative angle about the target vehicle interface base X, Y, and Z axes	37
VWRTT	Guide ring relative velocity with respect to the target vehicle interface X, Y, and Z axes	38
OWRTT	Guide ring relative angular rate about the target vehicle interface base X, Y, and Z axes	39
FORCE BETWEEN FINGERS 1/3	Normal force on the active guide edges 1 through 3	40
SAME FOR GUID	E EDGES 4 THROUGH 6	41
FORCE TARGET FINGERS/ RING 1/3	Normal force between target vehicle guide edges 1 through 3 on active vehicle guide ring	42
SAME FOR GUID	E EDGES 4 THROUGH 6	43
FORCE RING FINGER/TARGET 1/3	Normal force between active vehicle guide edges 1 through 3 on target vehicle guide ring	44
SAME FOR GUID	E EDGES 4 THROUGH 6	45
ACTIVE INTERFACE TORQUES	Docking moments about the active vehicle docking interface structural base X, Y, and Z axes RCS moments not included	46
TARGET INTERFACE TORQUES	Docking moments about the target vehicle docking interface structural base X, Y, and Z axes RCS moments not included	47
TARGET FINGER INTERFERENCE DISTANCE	Normal distance between target vehicle guides and some reference point on the active vehicle input by C(23) and C(24)	48



Name	Definition	Page
TMOTOR	Retract motor torque used to draw capture- latched vehicles together	49
FCABL1 FCABL2 FCABL3	Force in retract cables Nos. 1, 2, and 3 (not shown in example)	50





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CASE NO.28, ORBITER DOCKING, ASTP SYSTEM

ACTIVE VEHICLE

CHECZA YAO	-0.36019770E-10 -0.26146747E-01 0.62795721E-07	PHA PSA YA	0.4999081E+01 0.10038799E-05 0.31207905E+01 0.6005000E+07	GIEGYA RAD ZAD YYIA	8.29853811E+00 8.50008000E+80 8.19893939E+00 8.67380000E+87	THA XA ZA ZZIA	-0.58999990E+01 -0.17545181E+02 -0.75790192E+02 0.85600000E+05
MA.	8.7370000E+04	XXIA	0.60658000E+07	AIYY	•••		
AVIA	0.9999993E-03	XZIA	-0.25199987E+00	YZIA	9.2000001E-02	OFF.JA	8.83000004E-01
	· .						

TARGET VEHICLE

				CPECYT		THE	0.0
CHECK!	0.0	PHIT '	0.8	GE OT 1	7.4		
			0.0	100	8.73708008E+84	EX T	0.00050000E+07
CHE GZT	0.0	PST	4.4		****		-0.25199997E+00
	8.67380000E+87	2217	8.0560000000000	XYIT	0.99099999E-03	MZIT	-0.21 SEE 163. B-
YYIT	8.9/30000C*U/				- *************************************	RT	-0.94700003£+01
	A 20000001E-02	OFFJT "	-0.83000004E-01	GFFKT	-9.37 0 0000 % +02	~,	0.0,

C-ARRAY/ ATTENUATOR DATA

NO ATTEMUATORS . 6

8.978000E+05	0.176700E+01 0.391000E+00 0.122797E+01 0.0	0.700000E-03 0.900009E+02 0.449500E-01	0.8 0.750000E+00 0.063000E+01 0.0	0.0 0.9 0.182718E+61 0.0	6.19000E+01	0.0 0.0 0.0	-0.650000E+01 9.125000E+01 8.0 9.300000E+02 0.0
0.0	0.0					•	

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D - ARRAY

	-0.11383X+00	-A 66277W+60	0.0	0.0	8.75000E+81		
				0.0	-0.723798E+76		8.198000E+00
9.0	9.0	6 100000F+04	-0.338000E+60	0.254000E+01	10+300065.0	8.199008E+81	0.600000E+00
	8.2540000.400		0.0	6.0	0.0		

GROSSIAN COPENNOS

				DELPP		CASE	6.0
IPHASE	1	STOP	G.10000000E+02				
triorac	_		0.10000000E+\$1	DESILO	8.99999964E-01	JN	
LORAPH	1	· GLLP	9.100000000		•		
AT	15						



1108740103 022174 0003

CASE NO.28, ORBITER DOCKING, ASTP SYSTEM

INTERNATION DATA

DESH	0.2999996E-03	N	. 50	A3	0.6	45	9.1000000E-01
KAI	•	. AZ	0.990 000 775-05	*	0. 2990009 5E-03	A7	0.1999999E+00
AGA	A. S0000000E-03	má	6.1000000E-01				

MEACTION CONTROL SYSTEM

ACTIVE CONTROL SYSTEM

THEONA	-0.6000000E-01	PHCOMA	0.50000000E+01	PSCOMA	6.10030718E-05	AFDLA	8.09999999€+00
ATTA	#.8999988E+00	MIZA	0.00009999E+00	ADPIN	0.1000000E+01	ADTHA	8.10000000E+01
ACPSA	0.10000000E+01	MDA	8.0	FRA	0.9000000E+03	STA	10-3 0000005 .0
BANKA	6. \3000081E+06	BANYA	8.43800001E+08	DBANZA	0.43000001E+00	THA	9.10000000E+01
REACTA	8.5000000E+00	BANKA	0.09000999E+00	BANYA	8.80990909E+04	BANZA	0. 89999999 E+60
IR		PMXA	8.1000000E+62	YHAXA	6.1000000E+62	PROXA	0.10000000000000

TARGET CONTROL SYSTEM

RADTY ARET ADTHT EBANET	8.8 8.8900998E+60 8.1880088E+61 8.4388861E+60	ABYT ABYT ABPST THOONT	0.0 6.00000000E+00 6.1000000E+01	MZT	0.90000000E+63 0.0000000E+00 0.4300000E+00	BRT ADPHT DBANYT PSCONT	9.22989998E-01 8.1888888E-01 8.438888E-08 6.9
REACTT 001	6.0 0.10000000E+02	BWRIT DOP YMAXT	0.0 0.0 0.10000000E+62		9.0000000E+00 8.0 0.1000000E+62	BAKZT THT LACS	0.0999999999999 0.10000000E+01
INDI	1		8.10000000E+02	PTOURT	9.19999000t.vec	50-63	-



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CASE NO.28, GROLTER DOCKING, ASTP SYSTEM

THE PERSON WITH CONDITIONS

				TAGE	\$0+30000000.8	VELLAT	4.1999999E-66	
THANKS	4.90000000E+02	THIST	-6.60000000E+#1					
110000	0.30000		8.30800081E+80	THOMEG	8.90000000000	AVKIAT	8.5000000E+66	
OPEOR	8.8	COLE O I	0.300000 it02					
		THE PARTY	0.0999999E+02					
	a 768867/000E+08	11000	4.4542444					

STRONT VS AREA TABLES

-8.1000000E+61	8.31400001E+90
9.0	9.31400091E+00
10+38999995.9	8.18008002E-81
0.3500000E+01	8.31000000E-02
8.4000000E+01	8. IB499999E-62
0.43000002E+81	8.10000001E-02
@.45800000E+01	0.69999996 E-03
0.100000000100	a_accepgggg-03

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CASE NO. 28, ORBITER DOCKING. ASTP SYSTEM

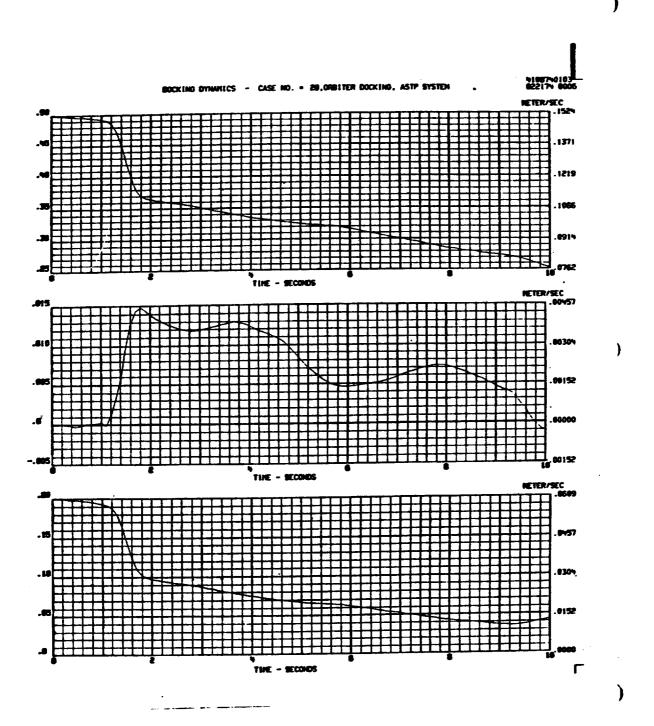
**** YARRA - ARRAY ****

6. 18000SE-62	9.8	8.0°	8.151460E+62	8.430000E+82	50+3000445.0	9.24400002+62	0.00000E-70
Q. 104728E+01	g.213200E+61	8.8W600E-81	0.0 .	0.0	8.907570E+00	0.512000E+01	6.6
€. 118897€+8 1	6.2160065-45	-4.99804E-67	0.0	0.0	€.€	●.●	. 0.0
6.6	6.6	C-9	€.0	6.119000E+0 6	8.0	0.0	6.0
8.6	8.6	€.6	8.0	0.0	0.0	0.0	6.0
2.6	6.6	0.0	€.0	9.6	0.6	0.0	8.0
6.6	6.0	6.6	•.• •	8.6	0.0	0.0	. •.•
6.158300E+01	6.0	0.0	ė.e	8.0	•.•	0.0	6.0
8.6	6.6	0.0	0.0	8.0	9.0000GE-78	0.325000€+90	0.234000E+81
6.6	6. LEBOSCE-43	6.70000E-62	9.700000E-62	9.0 .	0.0	0.0	•.•
6.6	8.488080E+62	0.320000E+06	0.0	0.0	0.0	•.•	6.6
6.6	6.0	9.0	8.190000E-42	#.988000E+80	0.0	e. 0	6.0
6.6	6.6	6.6	6.8.				

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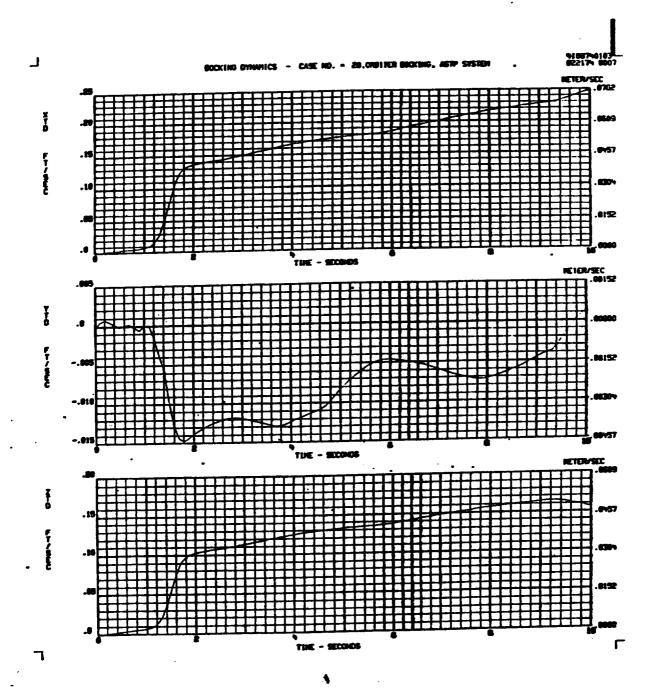
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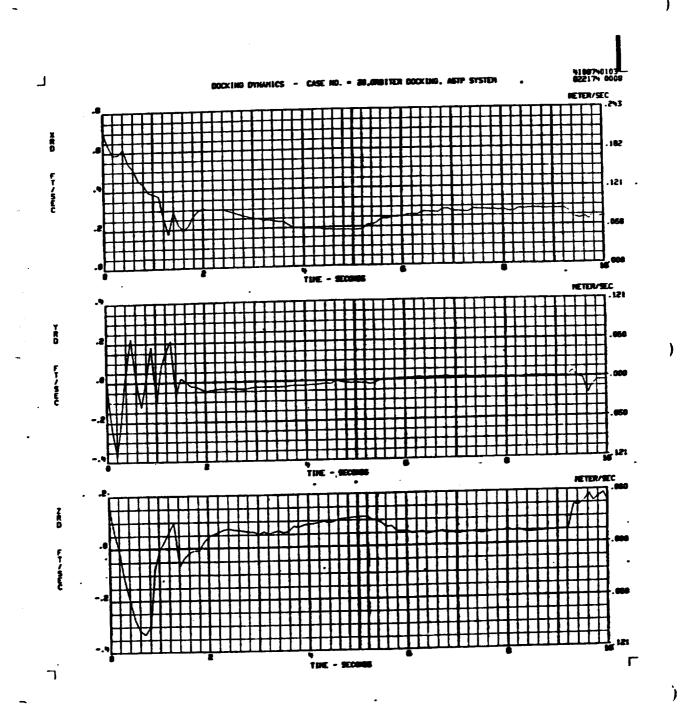


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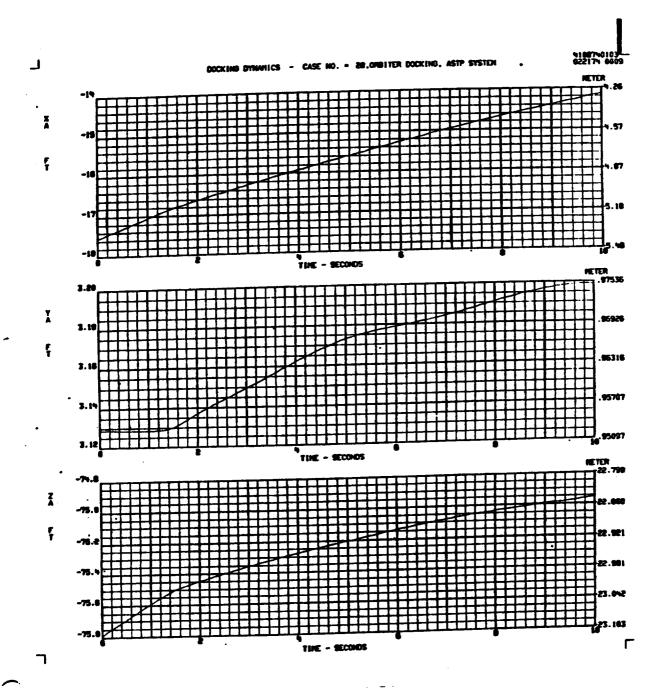




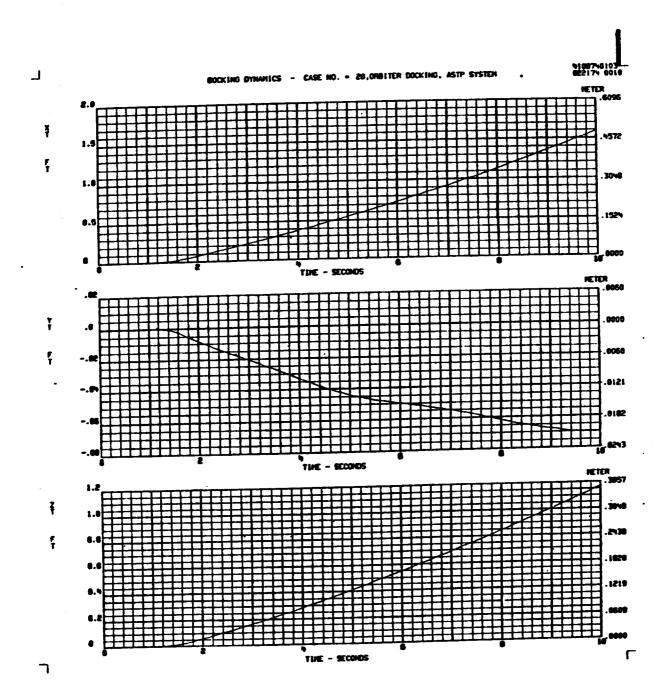




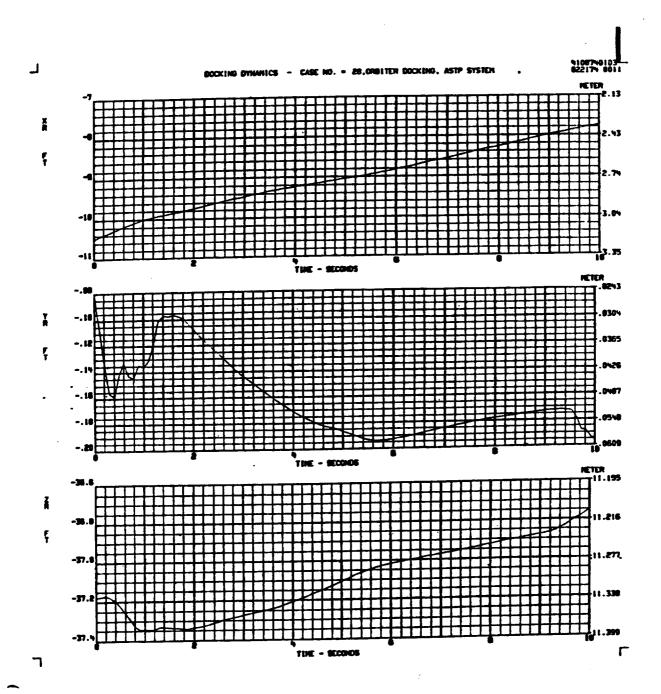




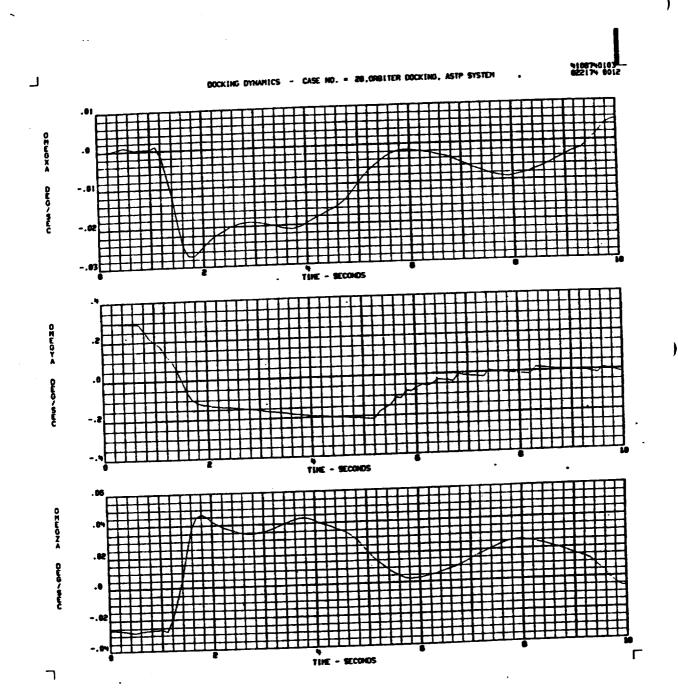






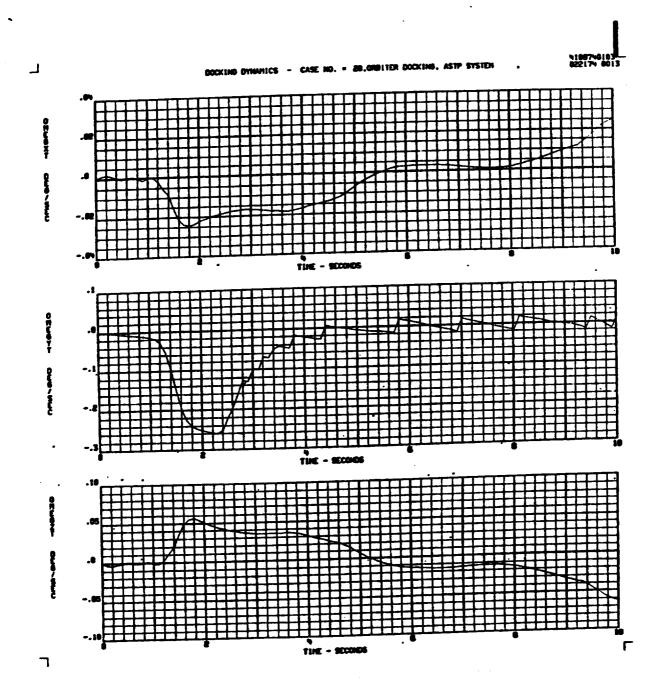




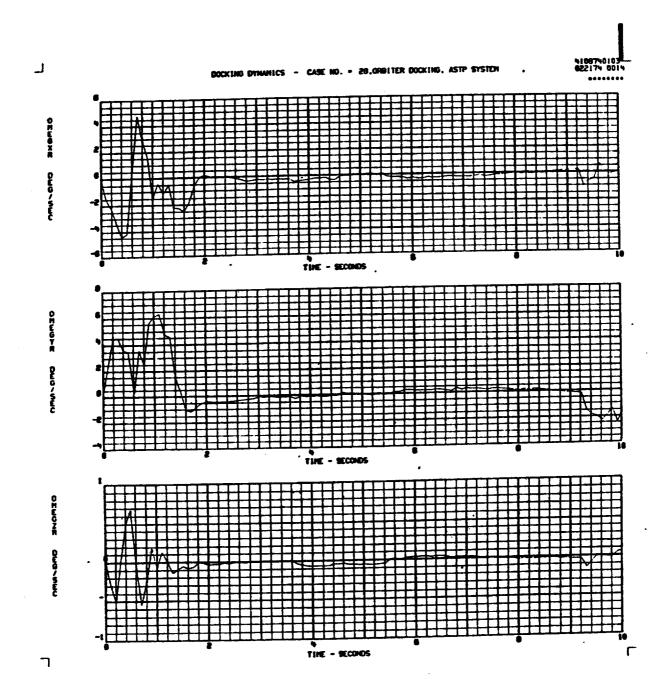


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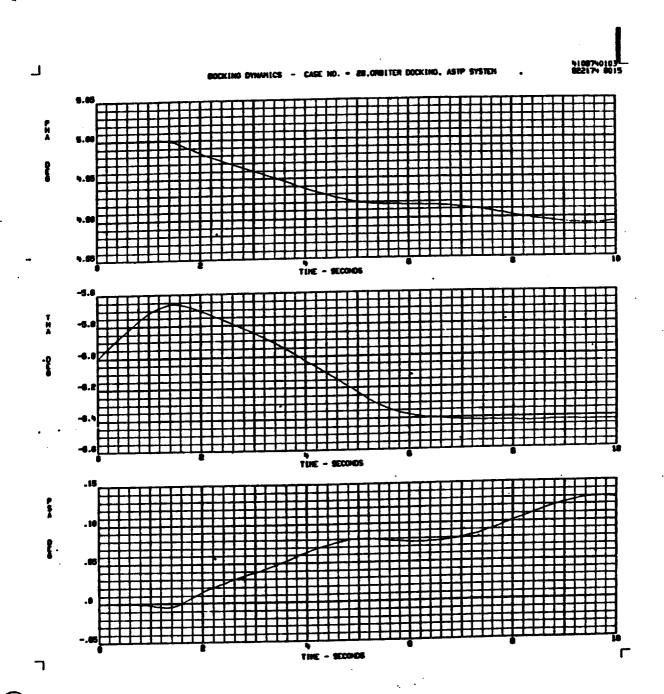




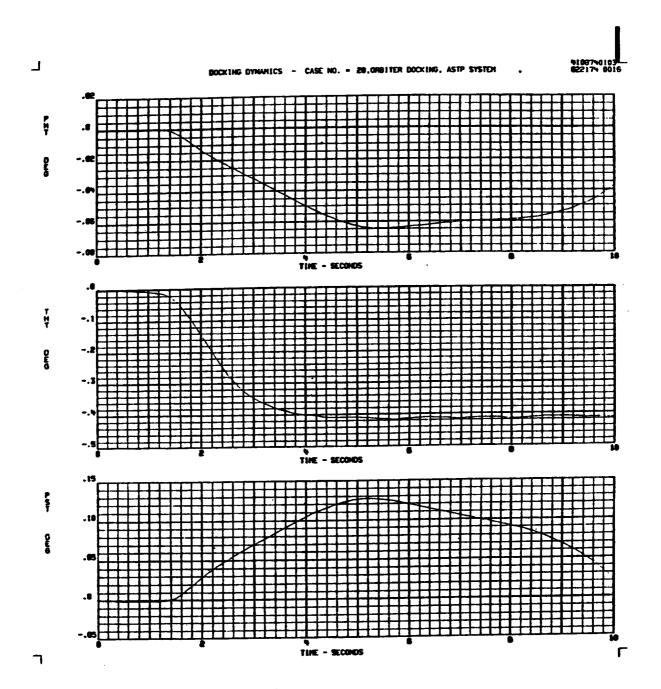


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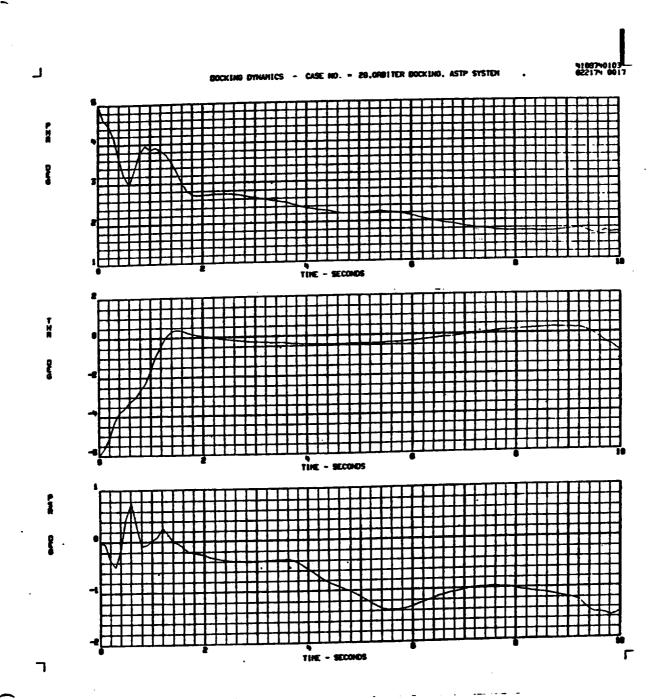


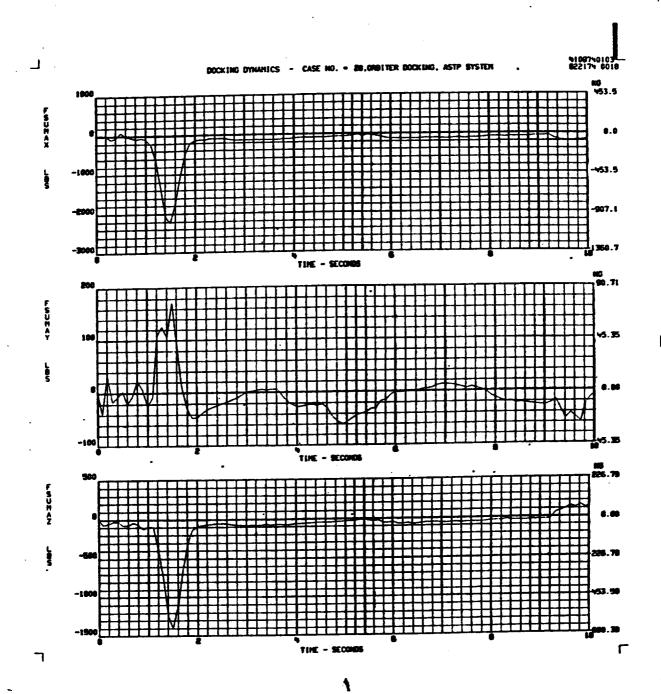




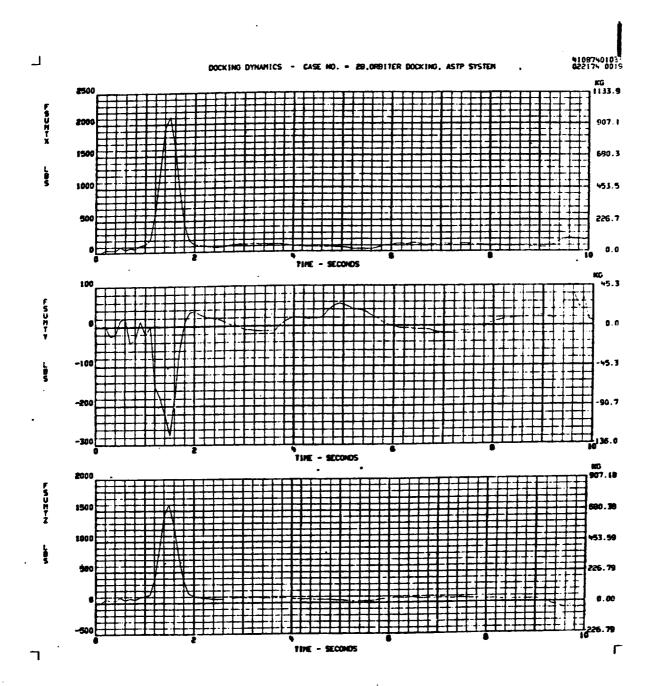
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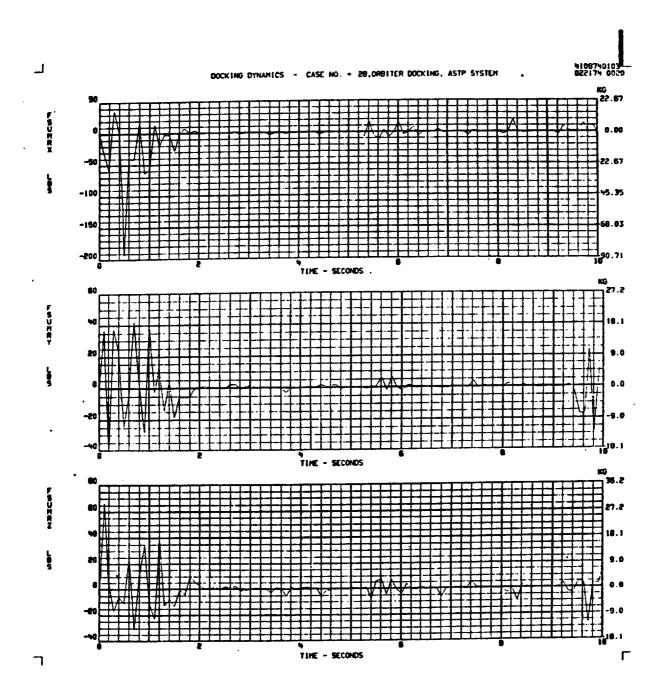




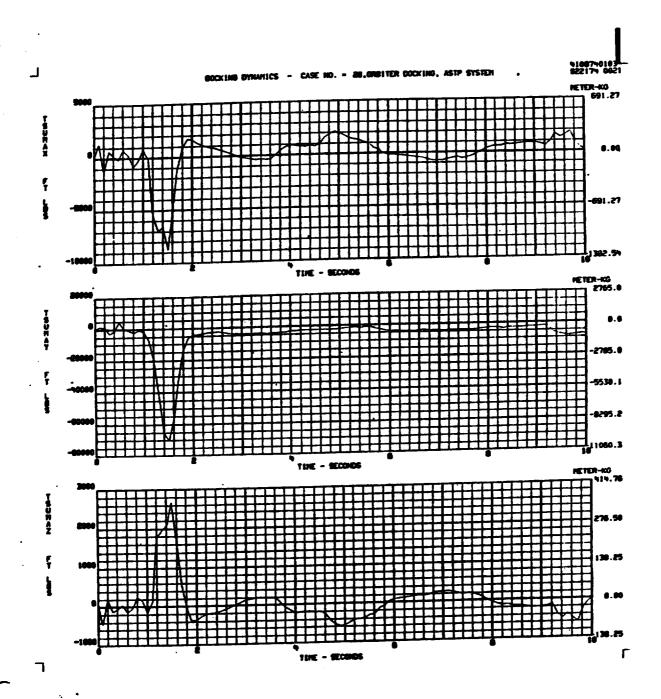




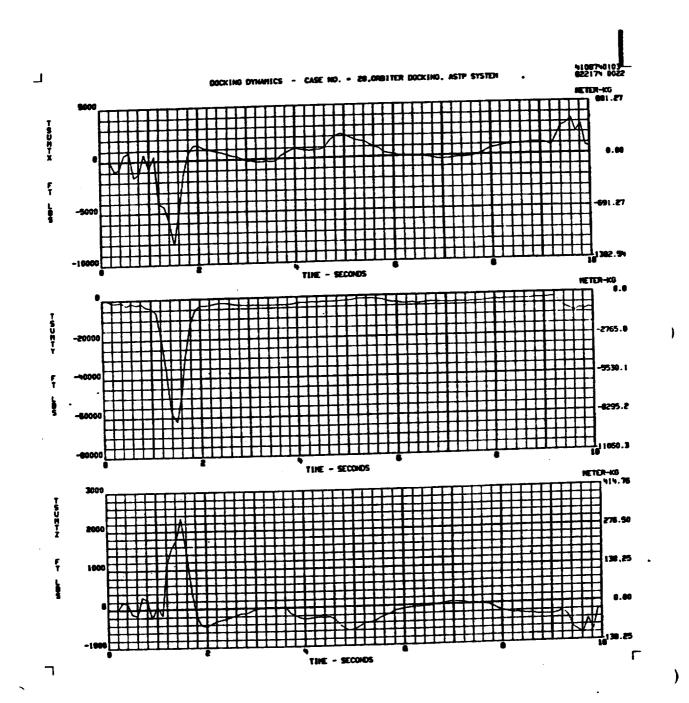




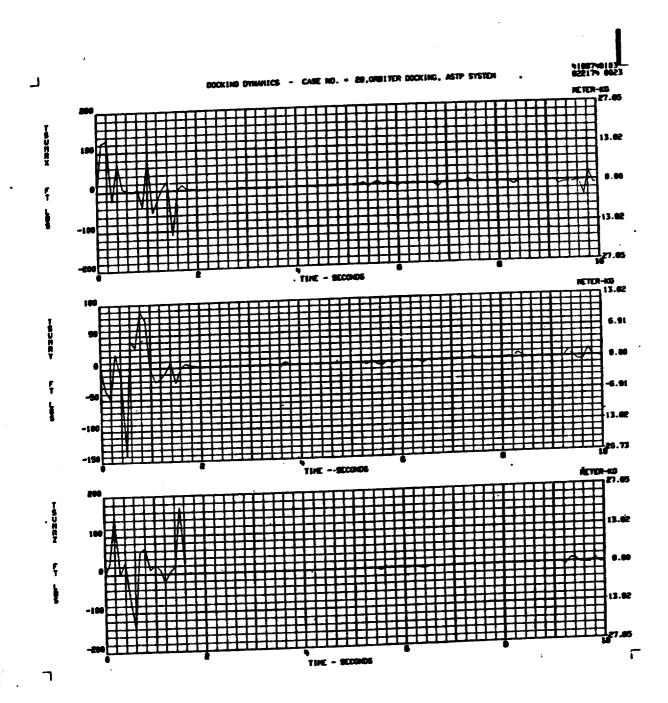




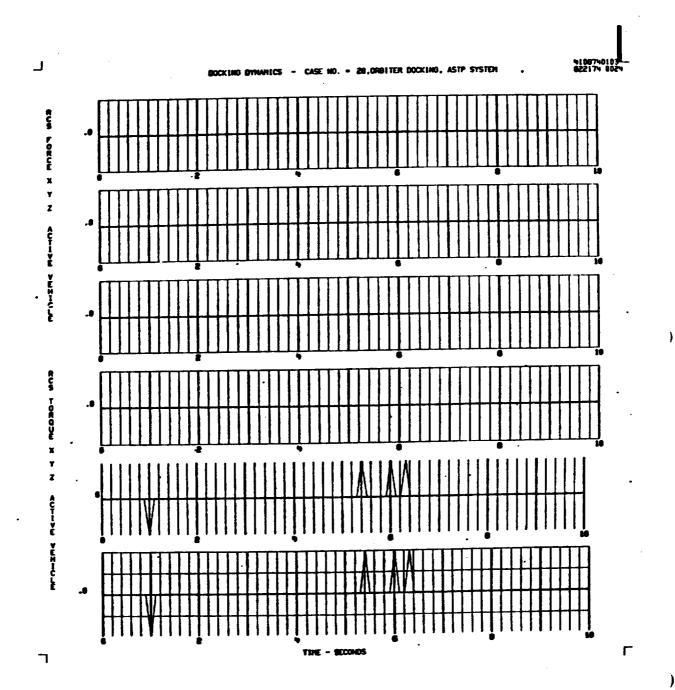






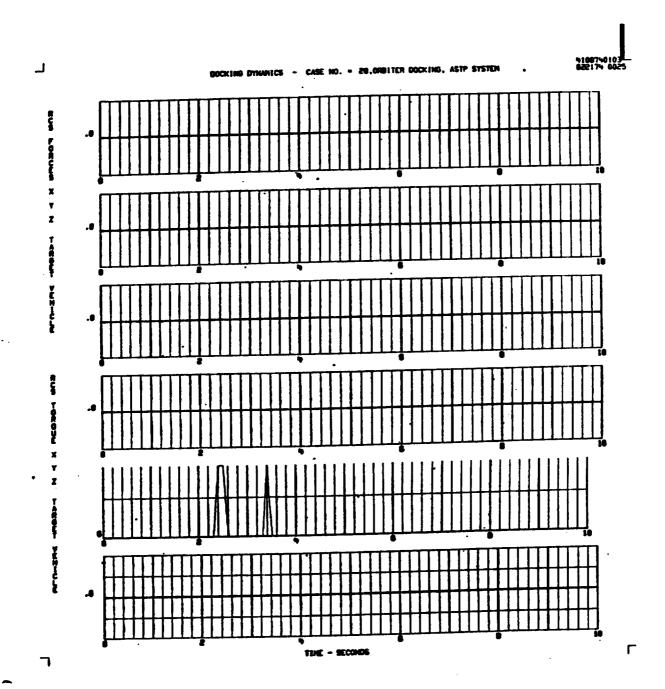




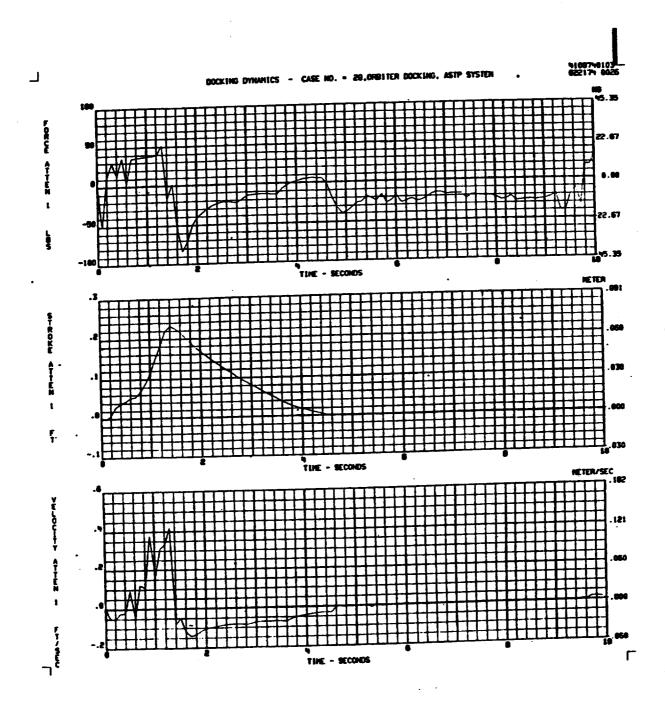


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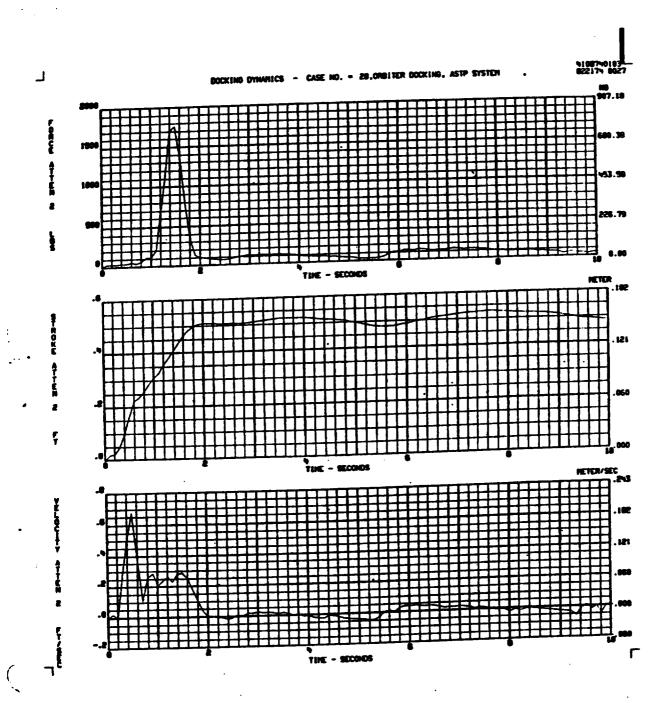




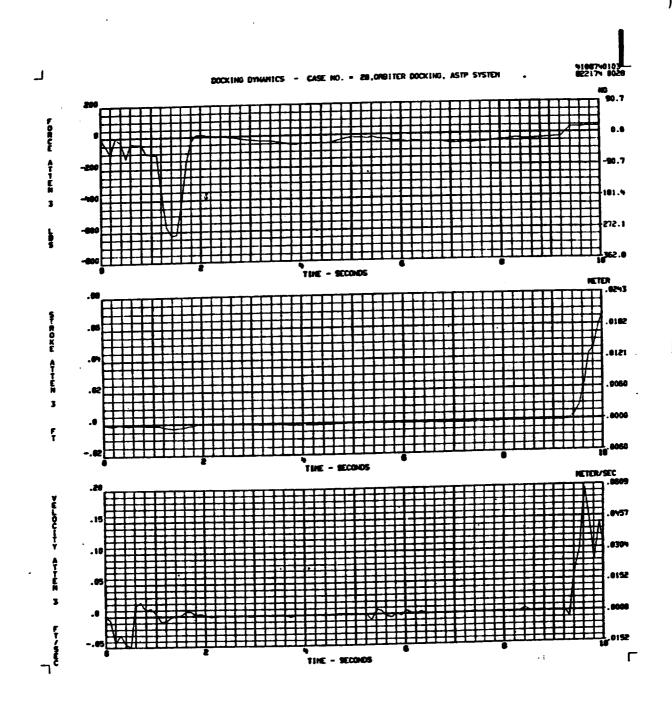
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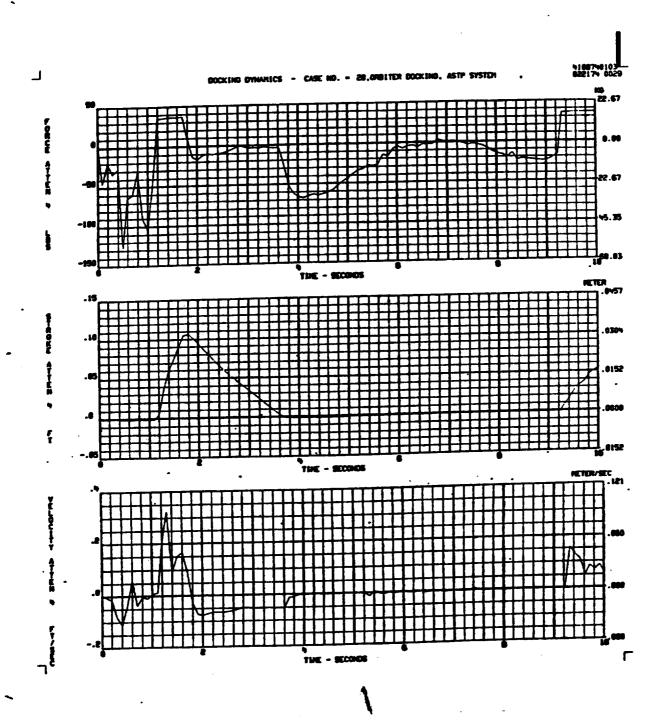




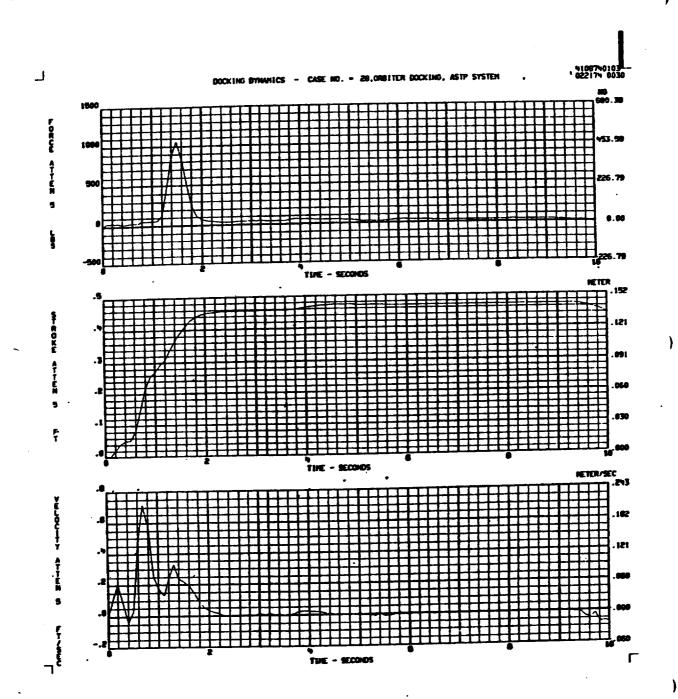


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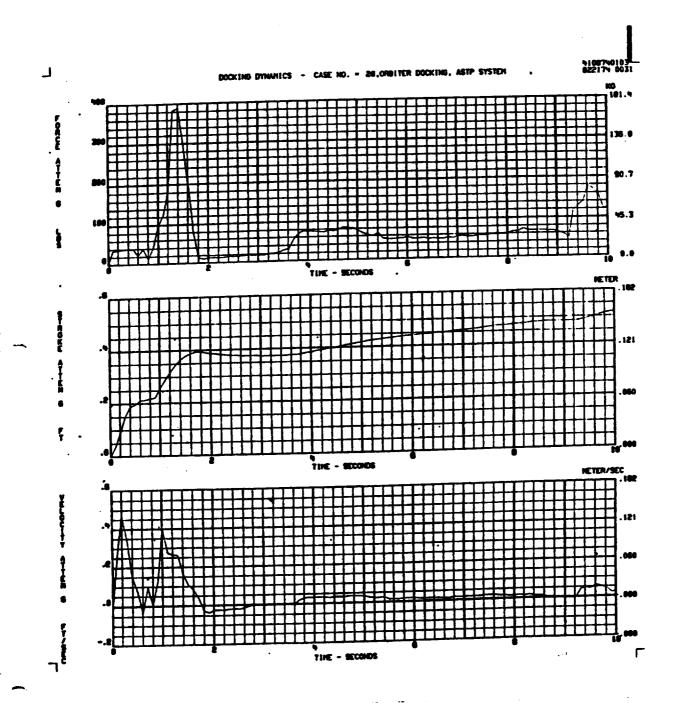


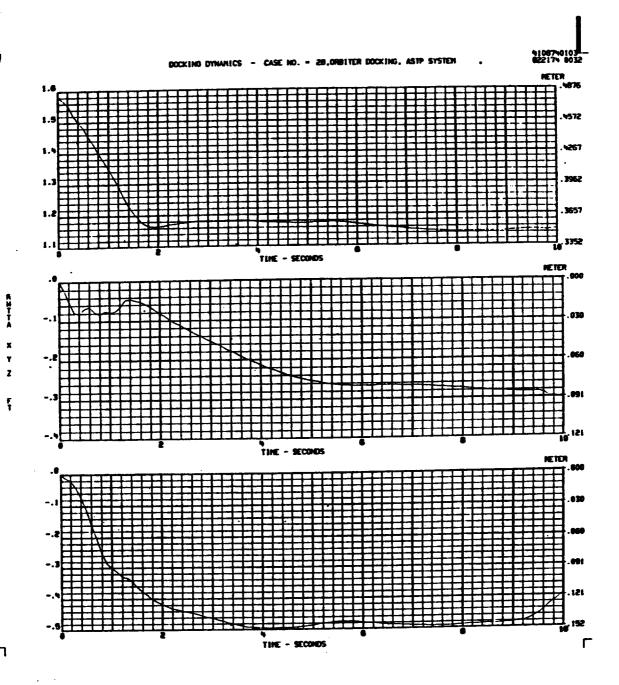




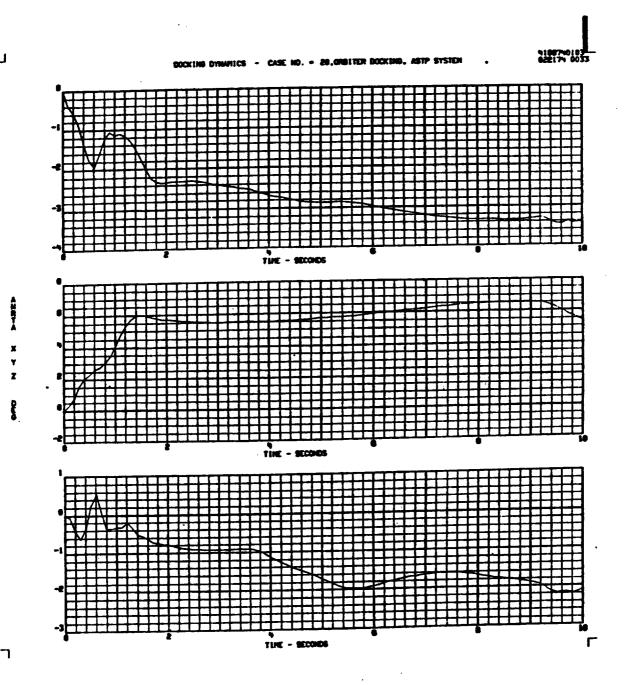




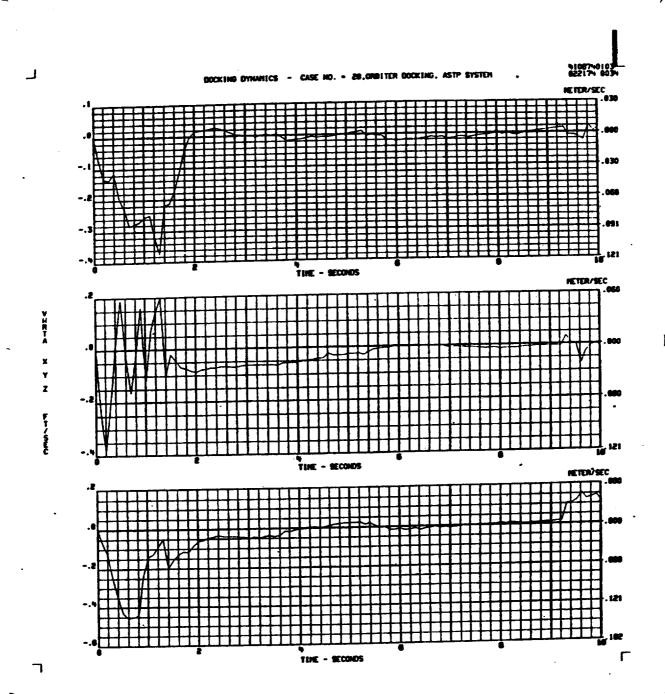






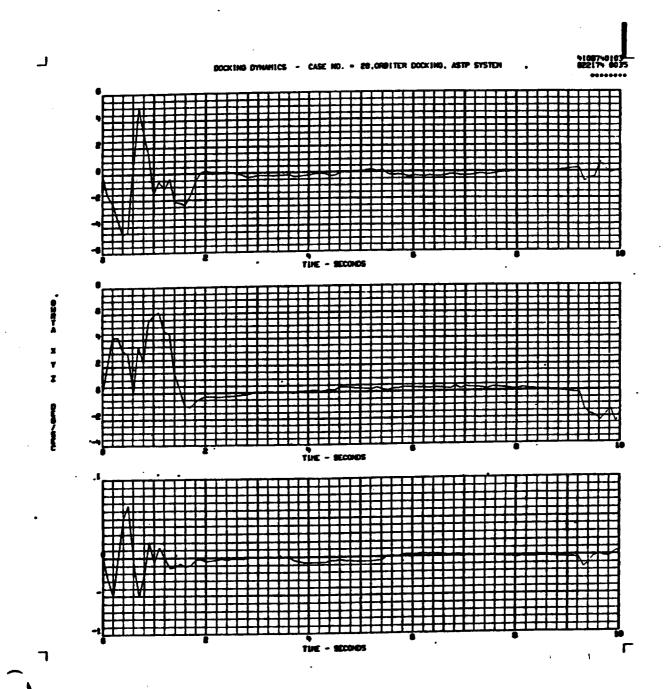




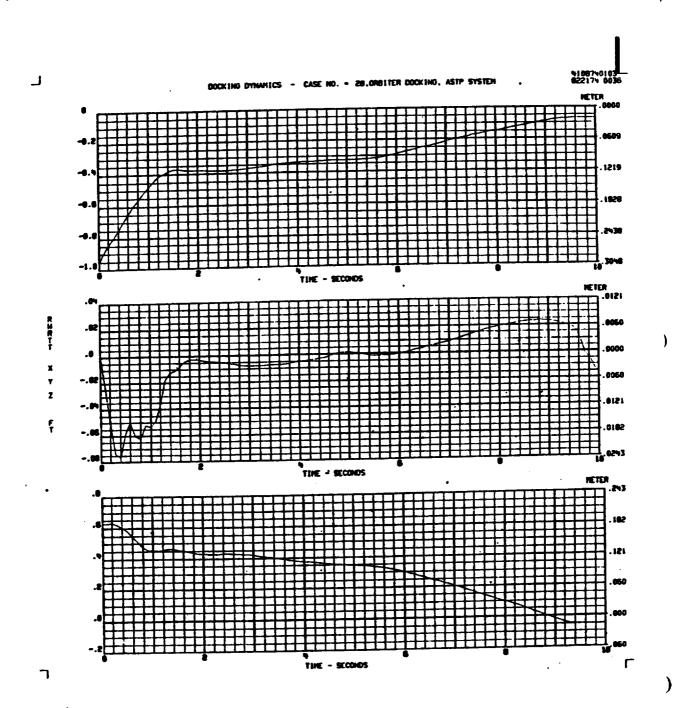


- 124 -



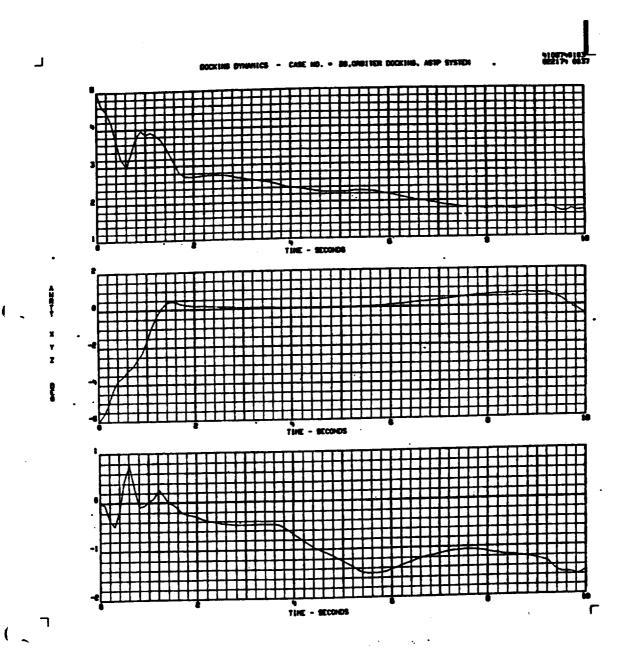




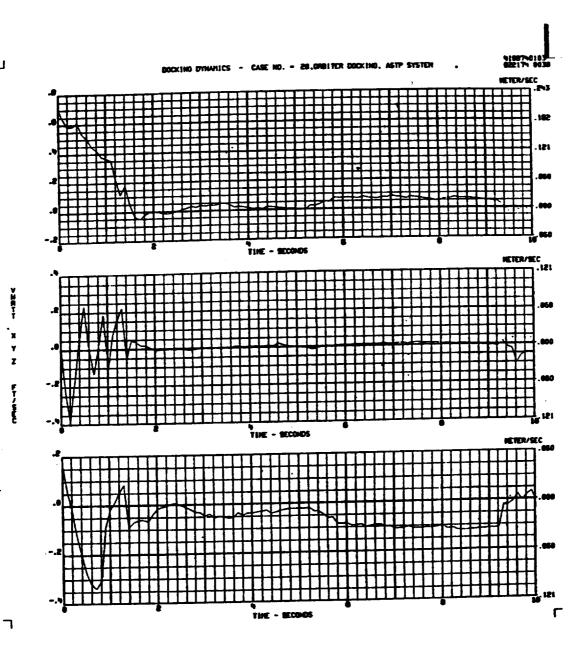


- 126 -

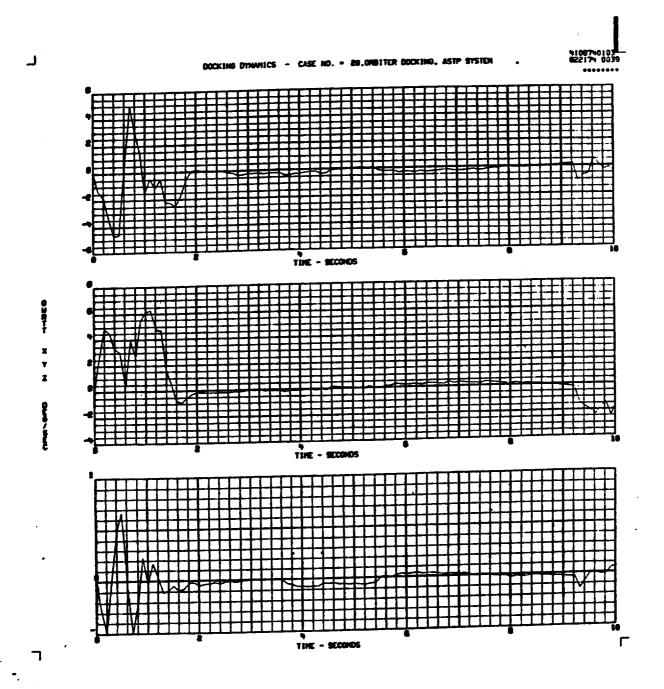




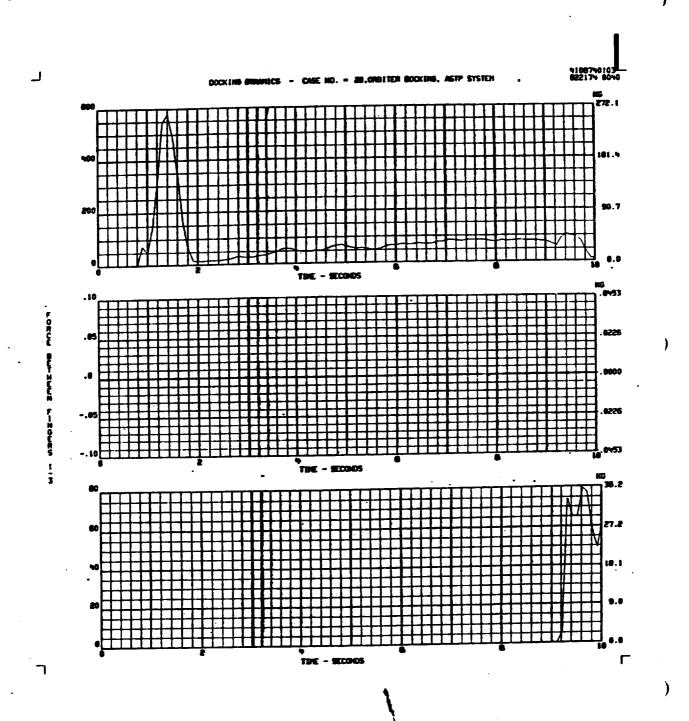




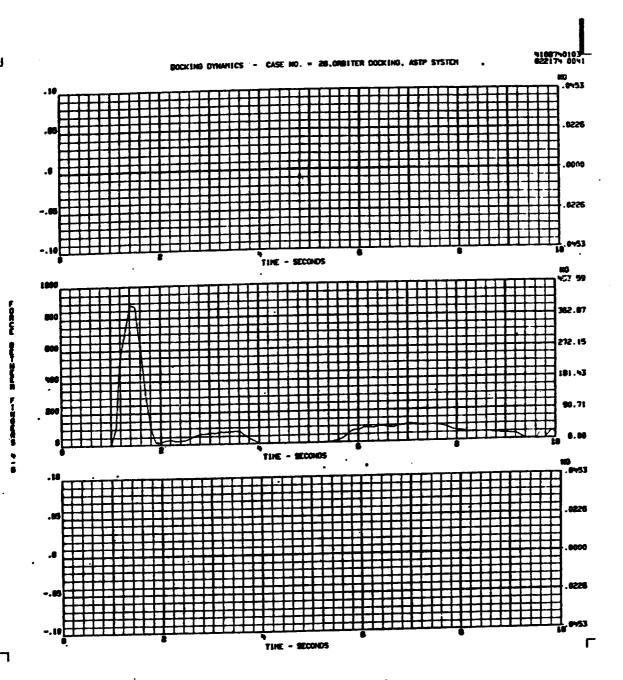




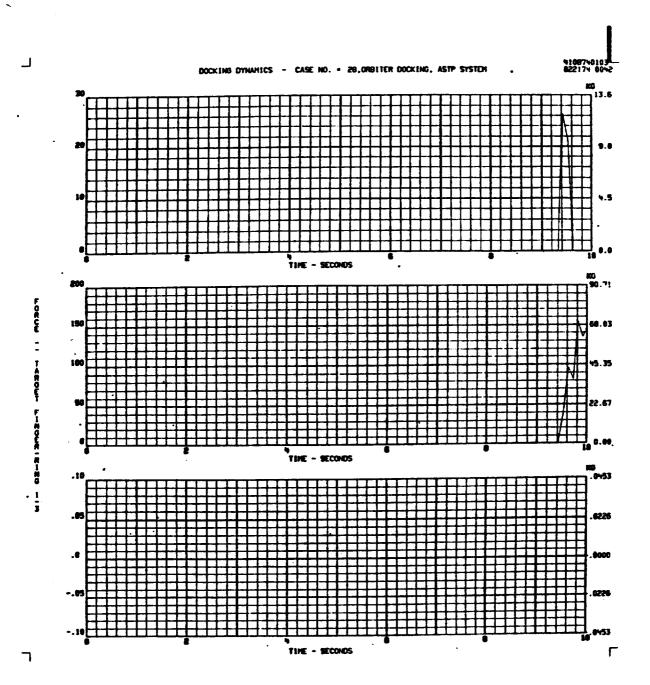




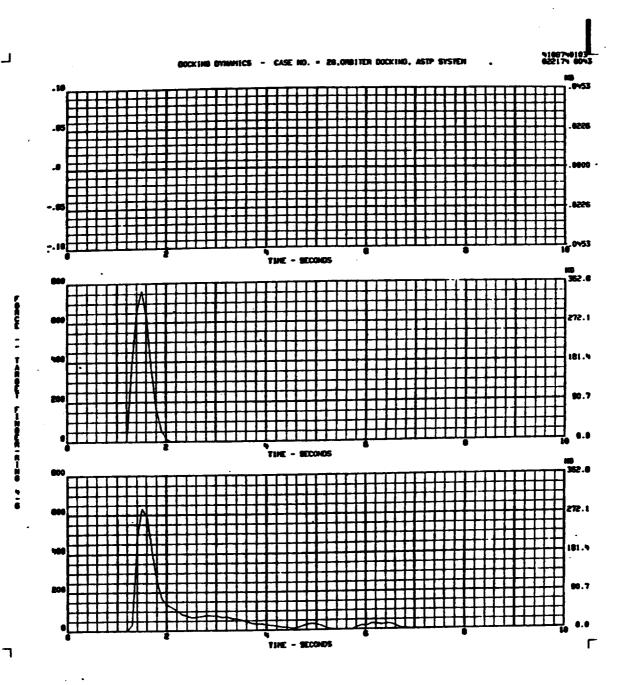
- 130 -



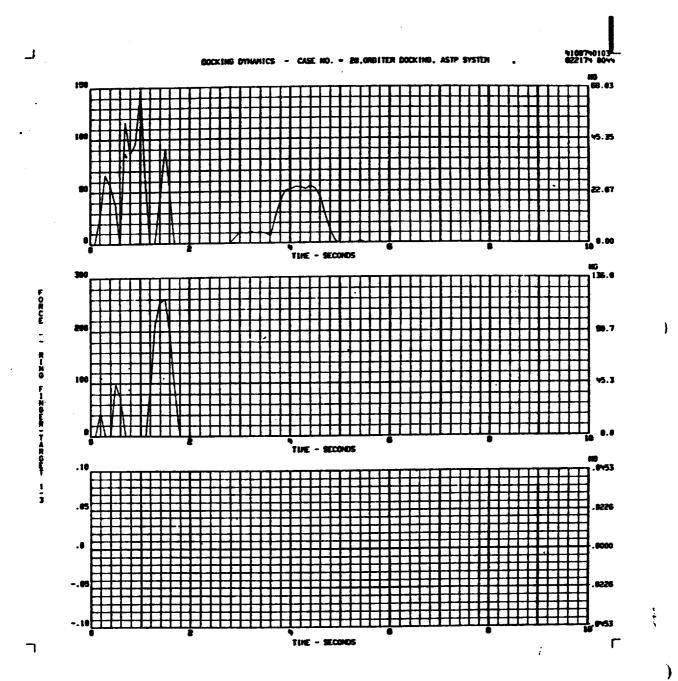




- 132 -

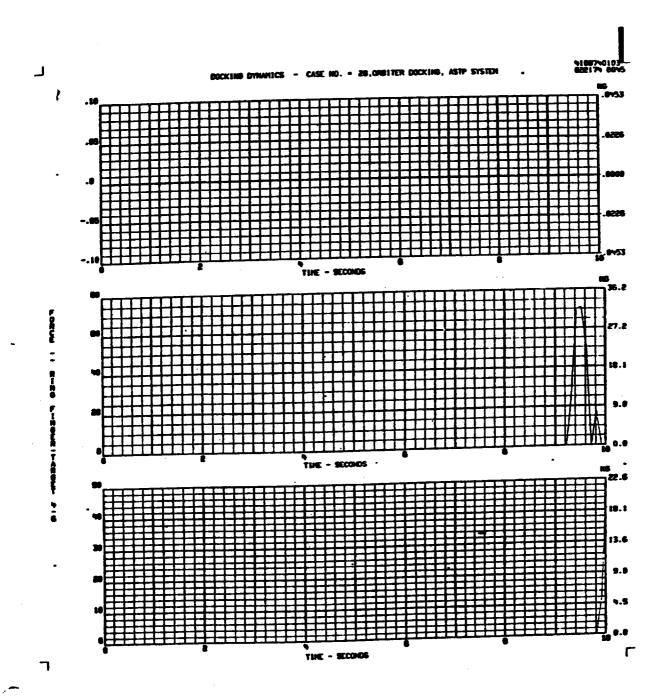




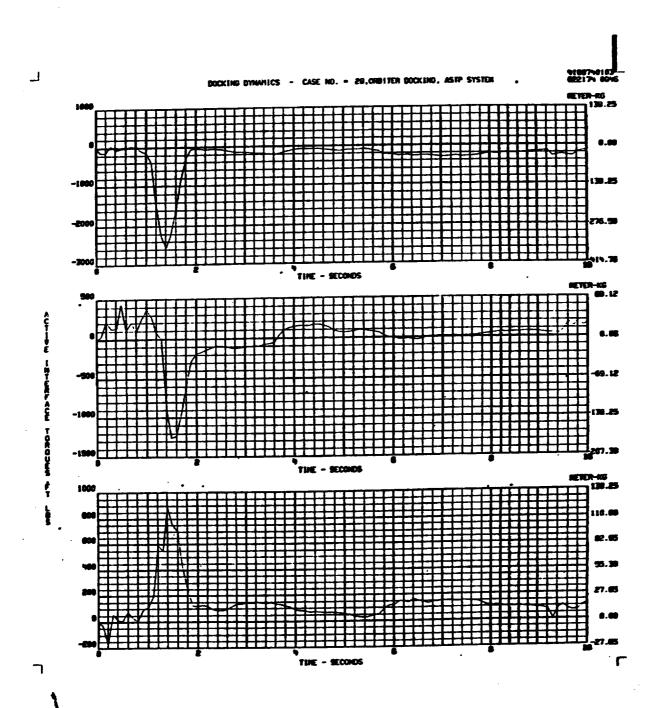


- 134 -



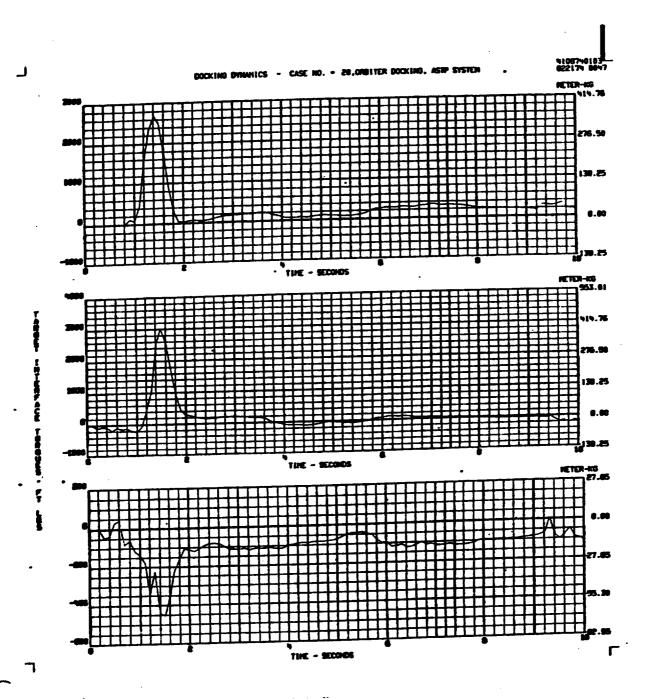




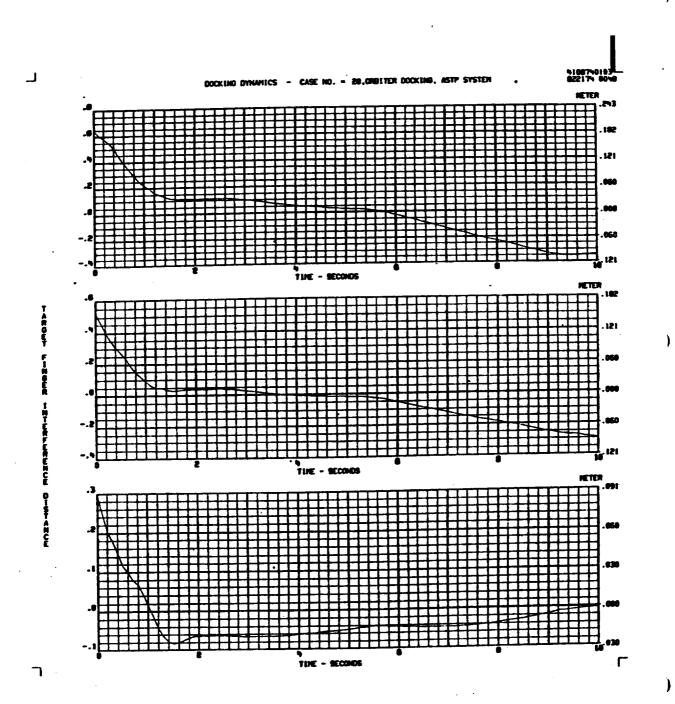


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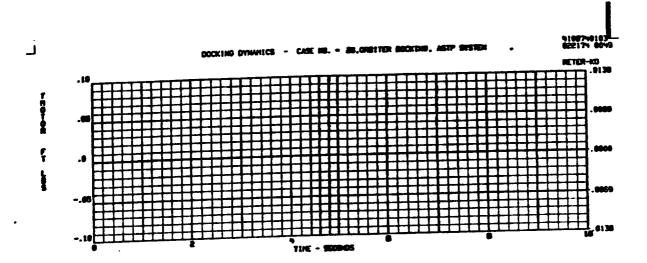






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ICHO TO HOLINT MAIL STOP BE

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80X NO. 896

DATE 74052

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PROGRAM FLOW DIAGRAMS



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- 142 -

CHART TITLE - PROCEDURES

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01 8EGIN DO LOOP 9993 I = 1, 261 9995 I = 1, 31 9998 1 - 1. 15 ACCTV (TEXT) AJ(1) = 0.0 DUFFG(1) = 0.0 SPAX(1) = END OF DO END OF DO YES TIMEP . (HTIME -LOAD INPUT DATA INTO IFRCE . 0 9501N DO LOOP 9996 1 = 1 2265 HOTE 41 TIMEP LE. SEGIN DO LOOP 1 J = 1. 650 CON2 . 0.0 \$111 - 0.0 CON3 - 0.0 TRUE VAR(J) = 0.8 TIMEP = 40. 9994 1 - 1, 40 END OF DO NOTE OF CTR(J,1) - 0.0 903 1 - 1. 50 TRT(J,1) = 0.0 VAR(1) = 0.0 #EGIN DO LOOP A.F(1) = 0.0 1 .01. 20 END OF 00 LOOP1 ADD(J) = 0.0 FALSE CTRT(J.1) = 0.0 TIME - 0.0 DUP917(1) = 0.0 END OF DO BEGIN DO LOOP 8010 1 - 1, 1000 SEGIN DO LOOP 9997 | - | 1150 (20) 0x(1) = 0.0 ADD5117 - 0.0 3.01

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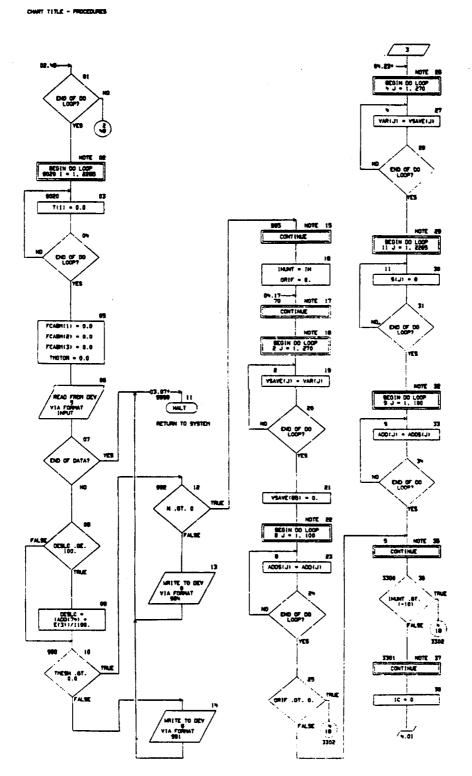
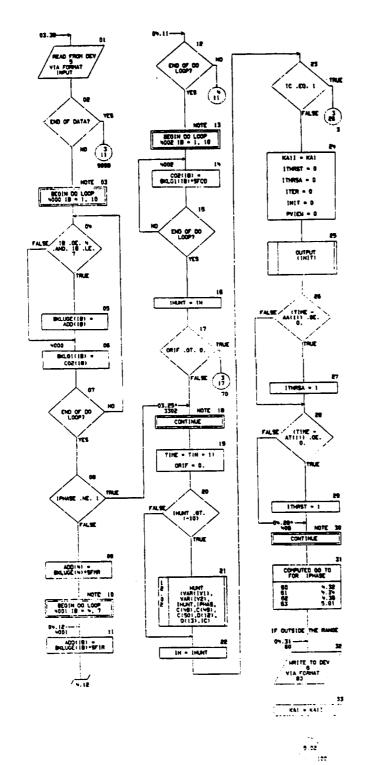
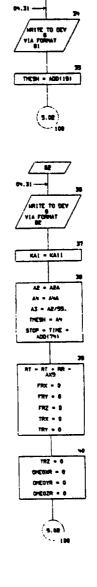




CHART TITLE - PROCEDURES

SD 74-CS-0023



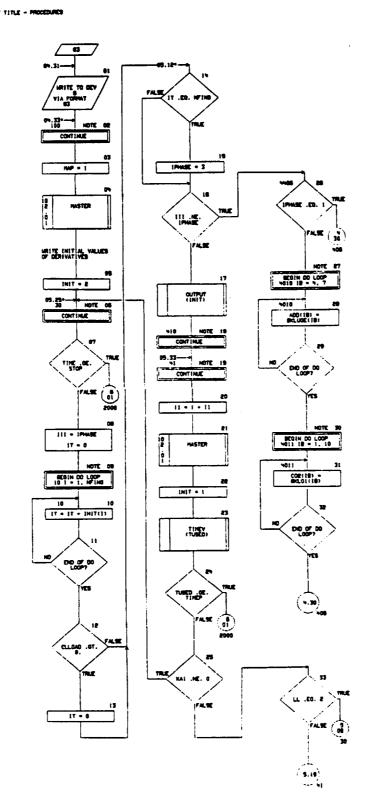




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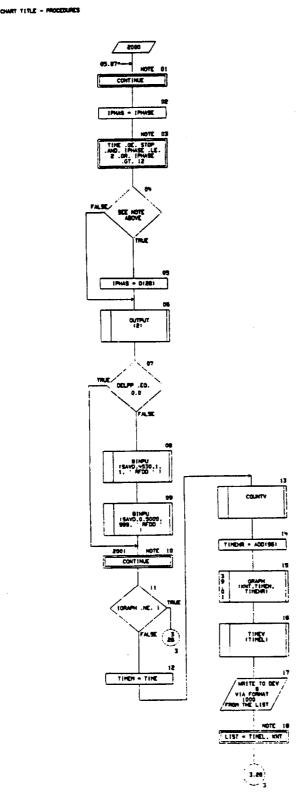
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DINDS10# SQUET101,80.011101
 EQUIVALENCE 1979R. BILLUEET1); 1979R.BILLUEET3); 19700, BILLUEET3))
DIMDISION YAR($400), T($895), A(15), 8(15), C(50), D(30), E(15), F(10),
                   AA(25) .AT(30) .CO(10) .SE(10) .VSAVE(270)
         $(8865).A00(100).A008(100)
. (TY, (8)1), (TK, (#)1), (AS, (E)1), (AY, (S)1), (AX, (1)1) $300, AVIUSE
                       (AZCOMO, 1817), (AYCOMO, (B)1), (AXCOMO, (T17), (T5, 18))
                        (TERRO, CELTE, (TYERRO, (111), CTERRO, (E11),
                       (THT, (81)11, (AZY, (81)11, (APY, (#1)1), (APT, (E1)1)
                       (T(17),PMT),(T(18),PST),(T(19),XP),(T(80),YP),
                       (T(21),27),(T(22),00),(T(23),VD),(T(24),20),
                        (TIES), NAD), (TIES), YAD), (TIES), ZAD), (TIES), XTD).
                        (7129), (7130), 270)
                        , !DK(181,3FD)
                     (ORY340, (1#1X0), (ORC340, (0#1X0), (ORC4, (8E1X0),
                     , (DK(142) , (PE270)
 COMMON/EFLEX/TIME.DX(150).ADDS(1800)
 BINDSON BURNELL BUFFELL
  CONTINUEDICE (CLICTY(1), CANALLY, (CLIFFO(1),FG)
  . (AISS, (CIA), (AIYY, (PIA), (AIXX, (E)A), (ARX, (B)A) BORGAN FUND
                        (AIB), KYIA), (AIT), KZIA), (AIB), YZIA), (AIB), OFF,M),
                         (A(18), OFFKA), (A(1)), RA)
  (1) 121, 12:01, 17:17Y, 19:01, 17:12X, 12:01, 17:01, 18:01, 22:171, 18:01, 17:17Y, 19:01, 17:17Y, 17:01, 17:17Y, 17:01, 17:17Y, 17:01, 17:17Y, 17:01, 17:17Y, 17:01, 17:17Y, 17:01, 17:17Y, 17
                        (8(9),3717),(8(7),3217),(8(8),7217),(8(9),37737),
                         ($110),0FF(T),($(11),RT)
    . (C(21).CLL0AD)
    . ICCCC . MATTERO
     , (C(97), 1519FL)
                       . (0(29) . (V) 1 . (D(36) . 1V2)
   EQUIVALENCE (E(2), (PMSE), (E(3), STOP), (E(1), DE,PP), (E(3), CASE),
                         (EIS),100APH),(E(7),00LP),(E(8),00SLC),(E(8),JN),
                          (E(19), (CASE)
   EQUIVALENCE (F(E), THESH), (F(S), H), (F(H), AS), (F(S), AS), (F(S), KA1),
                         (F(7),A2),(F(8),A4),(F(8),A7)
                        , (F(1) ,ABA) , (F(16) ,AMA)
                        (AGD(1), RR), (AGD(11), AKS), (AGD(8), NF (HG), (S(45), 1HTff)
     11
   DIMENSION INITIES!
    EQUIVALENCE (D(S).ORIF).(D(19).IN)
    COMMON/FORCE/FRX.FRY.FRZ.TRX.TRY.TRZ
    COUTYMENCE (MARE, THOOMS, TAKES), PROOMS, TAKES), PROOMS,
                           TAATS), MOTAL, TAATS), MYYAL, TAATS, MOZAL, TAATS, MOPHAL,
                           CAYT, (SEEAR), CART, CEEEAR), CARTON, COLEMAN, CARTON, COLEMAN
                         , IAYIMBO, (ELIMAL, IAMMBO, (PLIMAL, IAST, CEIMAL).
                           (ATSASA, (BI)AN), (ART) ART, (TI)ARI, (ARCIB), REACTA),
                           TASHMB, (18)AA1, TAYHMB, TOSHAA1, TABMB , (RETAA)
                         (RI, 1951AA),
    (ATCH, CETTA), (ATCT), CATCH), CATCH), CATCH), CATCH),
                           (ATCIS), ACTOTI, (ATCILL), (ATCILL), CRAMET),
                            (THOOHT, (#1174), (TSW80, (#1)74), (TYW80, (#1)74)
                           TATELS: PHODES: CATELTS: PRODUCT: CATELS: PEACTES.
                            . (TSMB, (15) TA), (TYMB, (85) TA), (TOMB, (8) TA)
                            (AT (88), TXT), (AT (83), TYT), (AT (84), TZT), (AT (85), FXT),
                            (TKAMP, (BS)TA), (TXAMY, (TS)TA), (TXAMR, (BS)TA)
                            SATISES, IRCS1, (AT (38), 1900)
      ($631), ($631), ($632), ($631), ($631), ($634), ($634), ($634),
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COUTVALENCE (VARIES, ATES), (VARIES), BIESS, (VARIES), CILIS.

((1)T, ((15)RAV), ((1)88, (105)RAV)

(VAR(811,8(1))), (VAR(1)1), E(1)), (WAR(186),F(1)), (11) CO. (181) RAVI, (13) TA. (181) RAVI, (11) RA, (821) RAVI



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COMON INITAL/AMILITINETP, IPALL, JTESTN. SLOPE
  PROBEA, TLSA, 11, TKA1, THESHI, CONST
COMMON /LOS/YARHI, YARHE, YARHS, XLCEL, XLCEE, XLCEE
COMPONITANES GAMAII. GAMAIR, GAMAII. GAMARI, GAMARR. GAMARR. GAMARI.
   . IETHAD.ESTHAD.SSTHAD.ISTHAD.EITHAD.SITHAD.IITHAD.EEANAD.SEANAD
    CANTEL CANTEL CARNO, SERVO, SERVO, SIRVO, SIRVO, SERVO, SE
   GARGE, GARGE, GARGIE, GARELE, GARGIE, GARGES, GARGES, GARGIE, 
    . 12040, 25040. 25040. 15040. 21040. 21040. 1 040. 22340. SE340
    OMESS, GAMESS, GAMELI , GAMELIS , GAMELS , GAMELIS , GAM
    ONC32.00C33.60F(1.00F(2.00F(3.60FE),00FR2.00FE3.0NF3),
    0MF32,0MF33
  EEBND, SEEND, (EBND, ESBND, SSEND, (SBND, EIBND, SI 2ND, 112ND,
COMMON/ON/IDA/COM1.COMP.COM3.CTR(3.NO).CTR?(3.20)
 COMONICALCUFS, FC. F1. TOR1.FS1, FSE, FS3, FCR1.FCR2, FCR3.ETA1,
   ETAE.ETAS.FRTIA.FRTEA.FRTSA.TLS1.TLS2.TLS3.FRT18.FRT88.FRT38.
     VELBI , VELBE, VELBE, VELP, FRICP, FRCI , FRCE, FRCE, FRCE, PROBE.
 CONHON/DROQU/ETA, YDC.ZDC
COPHON/RECAL/S
 COMMUNICATION
 COMMON/ADDNESS/ADD
  CORNON (ADDLE) M.F.(75)
 OTTENSION ARE(10),000(10),952(10),002(10),MPH(15),70E(15)
  EQUIVALENCE (ALF(D1), AMB(1)), (ALF(1)), OFD(1)),
                                             (((1)500, ((3)744), ((1)582, ((3)740)
                                               (ALF(93), RPH(E)), (ALF(80), TOE(1)).
                                              (ALF(41),17970), (ALF(42),JR2),
                                              (ALF (93) .JN3)
   CONTION/FHOR1/VHOR
   COPPONITINITINEO
   EQUIVALENCE (MPLOT.ET1)1. (IH.DT14)1.(INTRA,AGD(78))
   DOUBLE PRECISION TILI.TILE
   COPPON /TITLES/ TTL1(6),TTL2(6)
   CORMON /CA/ VCABR(3,10), VCABB(3,10), CABL(3,10), FCAB(3,10).
                                               THOTOR,FCABRETO
   COMMON /FRCE/ CONTX19.61.COMPX(9.6),1FRCE
                                                        DELST(10)
    COPPON /STRY/ TRT(3,20)
    COTTON /SAVC/ BAVD(302.(5), $MAX(15), 10X(15)
    COPPON /PRX/ TORG(3.8)
    DINDISTON TEXT(15)
     NAMELIST /HPUT/ A.B.C.D.E.F.AA.AT.CO.SS.T.ACO.ACCE.ACCS.HMASE.
      SFIR, SFIR, SFCO.
        IH, IXTRA.
        IFRCE, 179FG, JM2, CO2, 952, ABB, OFD.
        JAG, NPH, TOE.
         TTLL,TTLE.
                                                         IGRAPH, ICASE, N.KAL, IRCS, IVEH, ISTIPL, JN. HPLOT.
         ITABLE.
         IVI. IVE. NOTING, IR MATTEN
     FORMATI 181//// SH BK. 'THESH 15 2080'1
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     FORMATINEM **** NO CONTACT SETNEDI VENICLES ******//)
      FORMATE! **** INITIAL LATCH COMPLETED ! //)
     FORMATINEM ***** TIP LATCHED -ARM SINGLE CONTACT *****//1
     FORMATCH ///// M SK, GRAPHING THE +1,E16.8.1 SECONDS1,10X.
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ET - NEDO.FLO NEDO-FLOM

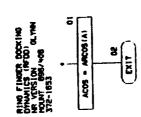


CHART TITLE - FUNCTION ACOS(A)

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DINENSION A(3), B(3)

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- 161 -

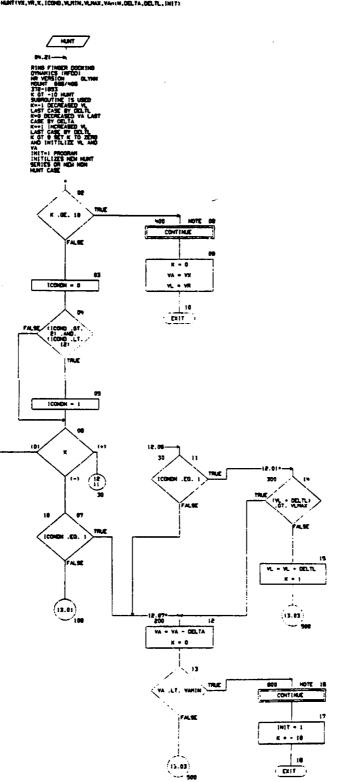
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MITTELON CHART SET - NECO.PLO NECO-

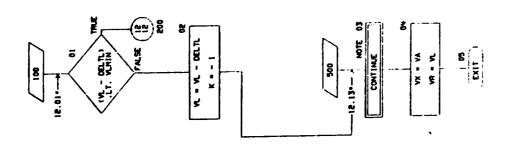
I.FLO NFDD-FLON PI





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CHART TITLE - SUBROUTINE HANTIVX, VA.K., ICONO, M.HIH, M.HAX, VAHIM, DELTA, DELTL. INIT)



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- 165 -

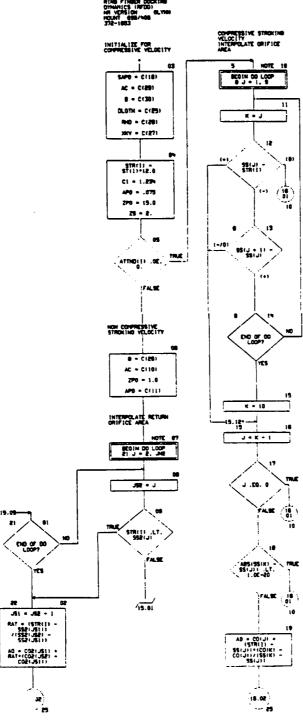
DWRT TITLE - INTRODUCTORY CONTOUT

DK1	- KINETIC TERM FOR VISCOUS FLOW IN ORIFICE	
RHD	- MISS DENSITY	LB8/900**8
XXCA	- KINEPATIC VISCOSITY	IN- IN-ACC
•	- HETERING PIN OR RETURN AREA	
AC	- ATTENUATOR CYLINDER OR RETURN AREA	
DLOHT	. GRIFICE LENGTH	
ST	. STROKE POSITION ARRAY	in.
ATTRO	- ATTENUATOR STROKING VELOCITY I+ FOR COMPRESSION	13
AS	. STROKE DISPLACEMENT	IM.
ASD	. STROKE VELOCITY	IN./900.
JE -	. MUMBER OF POINTS IN RETURN ORIFICE TABLE	
225 .	- RETURN ORIFICE STRONE	
cos .	- RETURN DRIFTCE AREA	
55 ·	- ATTEMATOR STRONG	
⇔ •	- ATTENUATOR ORIFICE AREA	
57	- SPRING LOAD PLUS FRICTION LOAD	LBS.
AD	" AREA OF MAIN ORIFICE	[M. 90 .
APO	- FISTON HEAD ORIFICE AREA	IN. 90.
SAPO	- ACCUPALATOR PISTON ORIFICE	IN.50.
A03	- HIOTH OF ORIFICE	10.
RHOYD	- HYDRAULIC RADIUS	IM.
VO	. VELOCITY OF OIL AT MAIN ORIFICE	IN./SEC.
YOS	. VELOCITY OF OIL AT ACCUMULATOR PISTON	IN./SEC.
ME	- REYHOLDS HUMBER AT PISTON HEAD AND MAIN GRIFICE	:
MES	- REYHOLDS NUMBER AT ACCUMULATOR PISTON	
Z	- LENGTH TO MIGTH RATIO OF MAIN ORIFICE	
23	- LENGTH TO HIDTH MATTO OF ACCUMULATOR PISTON ORT	FICE
2P9	- LENGTH TO HIDTH RATIO OF PISTON HEAD AT ORIFICE	:
F	+ FRACTION OF MAXIMUM PRESSURE RECOVERY DUE	
	TO STREAM EXPANSION FOR MAIN ORIFICE	
FS.	* FRACTION OF MAXIMUM PRESSURE RECOVERY DUE	
	TO STREAM EXPANSION FOR ACCURULATOR PISTON	
FPB	* FRACTION OF HAXIMUM PRESSURE RECOVERY DUE	
	TO STREAM EXPANSION FOR PISTON HEAD	
DC	- DISCHARGE COEFFICIENT FOR MAIN GRIFTCE	
ocs	- DISCHARGE COEFFICIENT FOR ACCUMULATOR PISTON	
OCP	. DISCHARGE COEFFICIENT PISTON HEAD	
FP	- FRICTION FACTOR FOR ANNULL OF FINE CLEARANCE	
	AND FOR PARALLEL PLATES FOR HAIN ORIFICE	
	AND PISTON HEAD	
FPS	- FRICTION FACTOR FOR ANNALI AND FINE CLEARANCE	
	AND FOR PARALLEL PLATES FOR ACCURLILATOR PISTON	
PHA	- TOTAL HYDRAULIC LOAD IN ATTENUATOR	L 05 .
PHAI	* HYDRAULIC LOAD IN ATTENUATOR AT PREVIOUS TIME	
PHAS	- ACCUMULATOR PISTON HYDRAURIC LOAD	LBS.
PHUP	+ HYDRALLIC LOAD AT PISTON HEAD	LBS.



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DWIT TITLE - SUSPOUTINE SHOCKIST, ATTHOUGH, FAD. J. FFRICP. FRICH



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- 167 -

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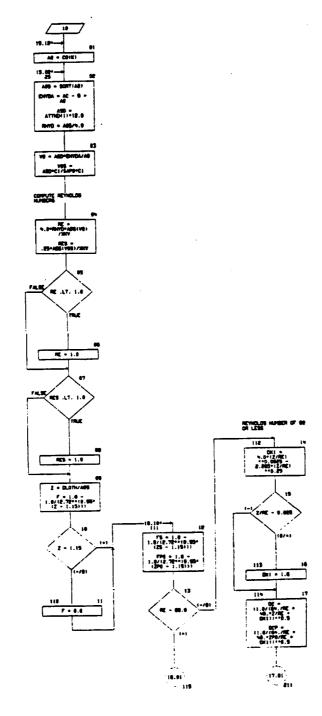
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AUTO-PLE OWNER SET - STEELFILE SPEEL-FLE

PASE 18

DWRT TITLE - SUBSCITUTE SHOCKIST, ATTHO, C.FAD, I, FFRIOP, FRIOPI





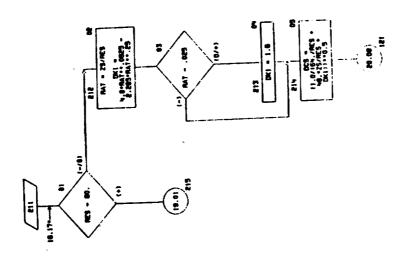
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AUTHOUND CHART SET - WICE FLO WICE-FLOW

CONTINE - REPORTING SUCKISTIATIO.C.FAO.1.FFRICP.FRICP.

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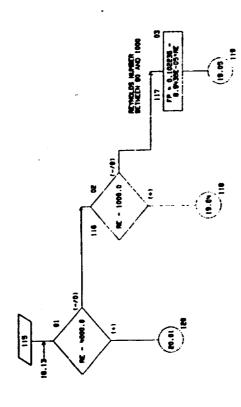
- 171 -

CWNT TITLE - SERBUTINE SHECKIST, ATTROLE, FAD. 1, FFRICP, FRICP.

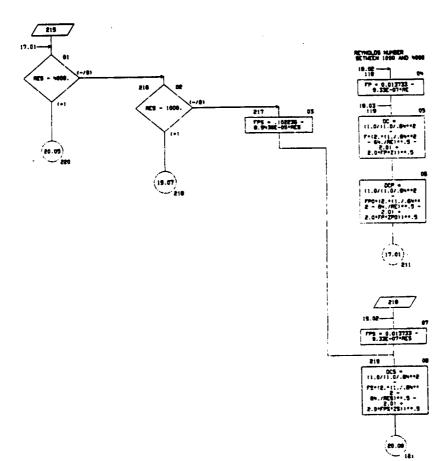
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PAGE 18

AUTH ON CHART SET + NEDD, PLO NEDD-PLON



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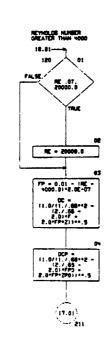
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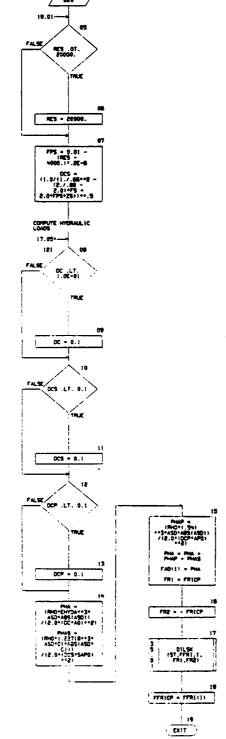
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2/22/SD

DIMENSION STRIED, ATTHORED, CISO, FADIRO, STIED

DIMENSION FEMOLETION, STICTOR

COMPOWERLEX/TIME, DX(1190), ADD5(1900)

FFR1 (20)

EQUIVALENCE (5(85), STI(1)), (FSK01L(1), \$(75))

DIMENSION COLID), 58(10) COMMON/RECAL/S(REBS)

EQUIVALDICE (CO(1), VAR(191)), (\$\$(1), VAR(201)) COPPON VARIZYBO)

COPPON /ADDLE/ ALF (50)

EQUIVALENCE (ALF(01), ABB(1)), (ALF(11), ORO(1)), DIHENSION ABB(10), ORD(10), \$52(10), CO2(10)

(A.F(21),552(1)), (A.F(31),002(1)).

(ALF(41), 175PO). (ALF(42), JA2)

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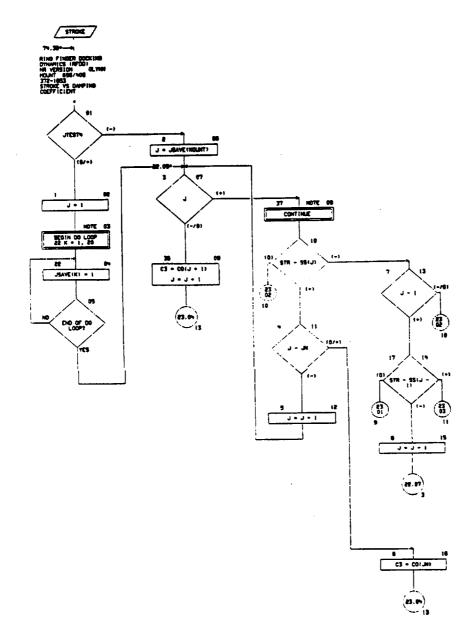
- 177 -

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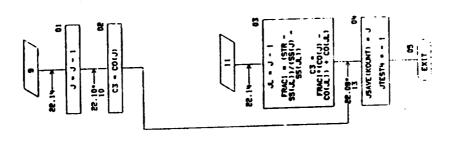


CHART TITLE - SUBSCUTING STREET, STR.1,C3,C0.58, JTESTA, JN



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CH CHART SET - PEDO.FLO REDO-FLOM

CHART TITLE - NON-PROCEDURAL STATEMENTS

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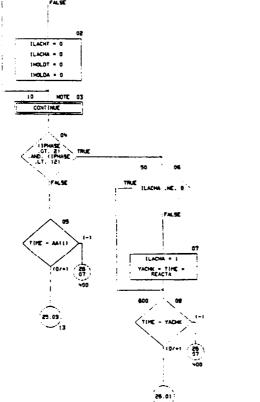
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AUT OH CHART SET - RETOURED RETOUTURE

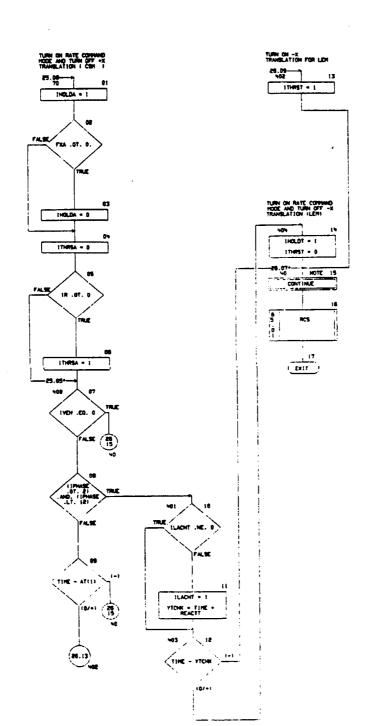
PAGE 23







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CHART TETLE - HON-PROCEDURAL STATEMENTS

DIMENSION YAR(\$460), T(\$860), A(15), 8(15), C(50), C(30), E(15), F(10), AA(25) ,AT(36) ,C0(16) ,95(19) ,VSAVE(279) \$(2205).ADD(100)

(T(6),2T),(T(7),OHEONA),(T(6),OHEONA),(T(9),OHEOZA), (T(18).0HE0XT).(T(11).0HE0YT).(T(12).0HE02T). (T(13)_THA) (T(15),FHA) (T(15),PSA) (T(18),THF). (T(17) .PHT) . (T(18) .PST) . (T(18) .XP) . (T(80) .YP) . (1(211,291,(1(24),20), (T(25),XA0),(T(26),YA0),(T(27),ZA0),(T(28),XT0), (T(29), YTD), (T(30), ZTD)

COLIVALENCE (ACE), MAIN, (ACS), MICH., (ACH), TYCA), (ACS), ZZIA), (ALE), (SIA), (ALE), (ALEX, (F)A), (ALEX, (B)A), (A(18),OFFICA), (A(13),RA)

EQUIVALENCE (8:2), XXIT, (8:3), XXIT), (8:4), YYIT, (8:5), 2211), (816) .XY17) .(8(7) .X217) . (8(8) .Y217) .(8(9) .OFFJT) . (8:101,0FFXT),(8:11),RT)

EDUTYALENCE (E(2), (PHASE), (E(3), STOP), (E(4), (PLOT), (E(5), (TABLE), (E(6), (0RAPH), (E(7),0ELP), (E(8),0ESLC), (E(8),JR), (E(10),ICASE)

EQUIVALENCE (F(2), THESIG, (F(3),N), (F(9),A3), (F(5),A5), (F(6),KAL), (F(7),A2),(F(8),A4),(F(8),A7)

EQUIVALENCE (AA(8), THEOMA), (AA(3), PHEOMA), (AA(4), PSCOMA), (AACS), ARKA), (AACE), ARKA), (AACS), ARZA), (AACE), ARRAL, TAYT, (SCIARI, TAXT, TELLARI, TARGA, TELLARI, TANTON, TELLARI , (AAT131, TZA), (AAC14), (BBARKA), (AAT15), (BBARYA). TAATIGI JOBANZAI, TAATITI FXAI, TAATIEI MEACTAI. (ASHAB, (15)AA1, (AYHAB, (05)AA1, (AINHAB, (61)AA1 . (AA (22) . IR)

COUTYALENCE TATTES, CONNORT, TATTES, CHARGE, TATTES, TATTES, CENTRY, CATTES, C (ATIBLIARY), (ATIT) ARY), (ATIB), ARZ), (ATIS), ADPHI), (TIMASO, (\$1174), (TENDA, (\$1174), (THTOA, (\$1174) (THOOHT, (21)TA), (TSHARD, (#1)TA), (TYHARD, (£1)TA) (ATC18) PHONEL (ATC17) PSCONE) (ATC18) REACTEL (TSMAB, CISITA), CYMAB, (DS)TAL, CHMAB, (ELITAL (11/23) (121) (121, (42) (111) (121, (23) (11) (121) (121) (ATCES) .RMAXT) . (ATC27) . YMAXT) . (ATC28) .PMAXT) . (AT(29), (RCS), (AT(30), LVEH)

. (\$(\$). (\$(\$). (\$(\$). (\$(\$). (\$(\$). (\$(\$). (\$(\$). EQUIVALENCE (VAR(1), A(1)), (VAR(18), B(1)), (VAR(31), C(1)), TVAR(RE) .D(1)) . (VAR((11) .E(1)) . (VAR((26) .F(1)) . (VAR(136), AA(1)), (VAR(16(), AT(1)), (VAR(191), CO(1)), (VAR(201).55(1)),(VAR(211).7(1))

COMMON YAR COMMUNICEFLEX/TIME.OX(150),A005(1000) CONTON/PP/HAP.LL COPPONEINITAL/ARMI, TIMEPP, IPULL, JTESTY, SLOPE PROBEA, TUBA, LL. INAL, TRESHE, CONST COMMON /LOG/YARMI.YARMZ.YARMS.XLCBI.XLCBZ.XLCB3 COMMON/TRANS/ DAMAIL, GAMAIS, GAMAIS, GAMAZE, GAMAZE, GAMAZE, GAMAZE, LETHAD. ESTHAD. SSTHAD. STHAD. STHAD, STHAD. EEAHAD. SEAHAD. CAPITE CA CAMPSE, CAMPSS, CAMESS, CAMESS, CAMESS, CAMPSS, CAMPS, CAMPS, CAMPS, CAMPSS, CAMPS, CAMPS, CAMPSS, CAMPSS, CAMPS, CAMPS, CAMPS, CAMPS, CAMPS, DAMESS, GAMESS, CAMOI I, GAMDIS, DAMOIS, GAMOSE, GAMOSS, GAMOSS, GAMOSS, GAMOSE, GAMOSS, GAMCEL, GAMCER, GAMCEL, GAMCER, GAMCER, GAMCES, GAMCER, GAMCAR, GAMCAR GANCSE, GANCSS, GAMPII, GAMPIE, GAMPII, GAMPEL, GAMPES, GAMPES, GAMPES. GAMPS2.GAMPST CAPPAD, SERMAD, ICEMAD, ESCHAD, SERMAD, SERMAD, SIRMAD, SIRMAD, SIRMAD, SIRMAD, COMMON/CALCU/FG.FC.F1.TOR1.F91.F92.F93.FCR1.FCR2.FCR3.ETA1.

ETAB.ETAS.FRTJA.FRTSA.FRTSA.TLS1.TLS2.TLS3.FRT18.FRTS8.FRT38. VCLB1, VCLB2, VCLB3, VCLP, FRICP, FRC1, FRC2, FRC3, PROBCL COPPION/CAS/ CASE COPPION/DROQU/ETA, YOC, 200



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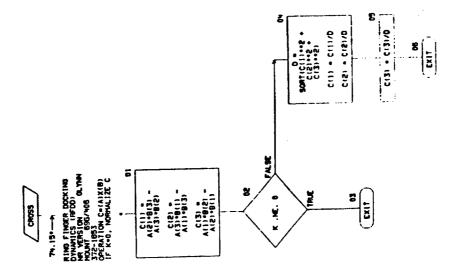
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OH CHART 9ET - NETOD.FLO RETOG-FLON

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E - NON-PROCEDURAL STATEMENTS

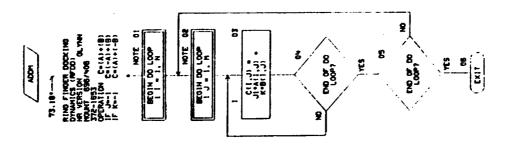
DIPENSION A(3), 8(3), C(3)

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AUTPMICH CHART SET - NEDO, PLO REDO-FLOH

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AUTIFICAL CHART SET - NECO.PLO NECO-PLON

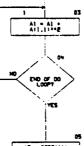
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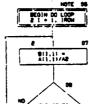
CHART TITLE - SUBMOUTINE NORMALS. IRON. 101

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AUTTO ON CHART SET - NETO, FLO NETO-FLOM

CHART TITLE - NON-PROCEDURAL STATEMENTS

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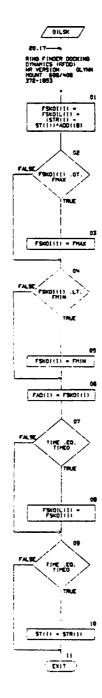
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DINENSION STREED), FSXOIL (10), ST(10), FAD(20), FSXOI (10) EQUIVALENCE (\$(65),ST(1)),(\$(75),FSK01L(1))

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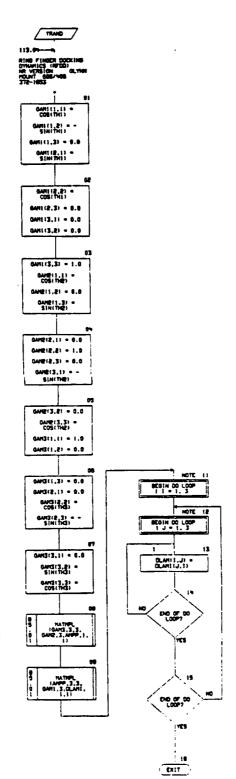
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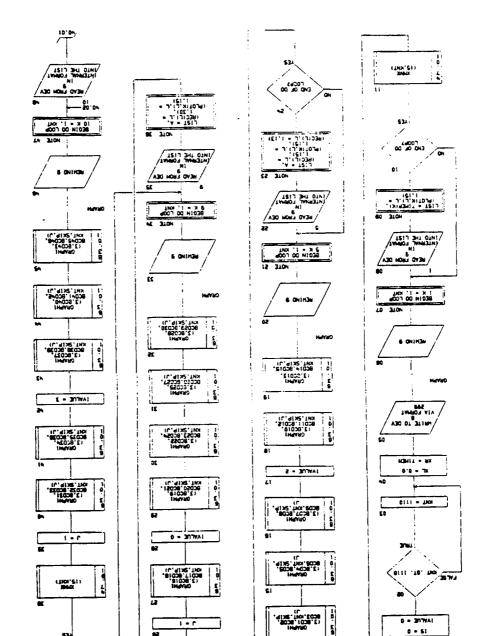
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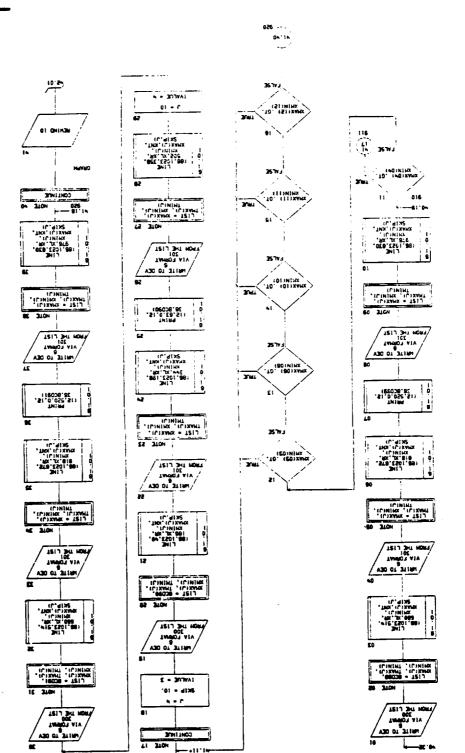
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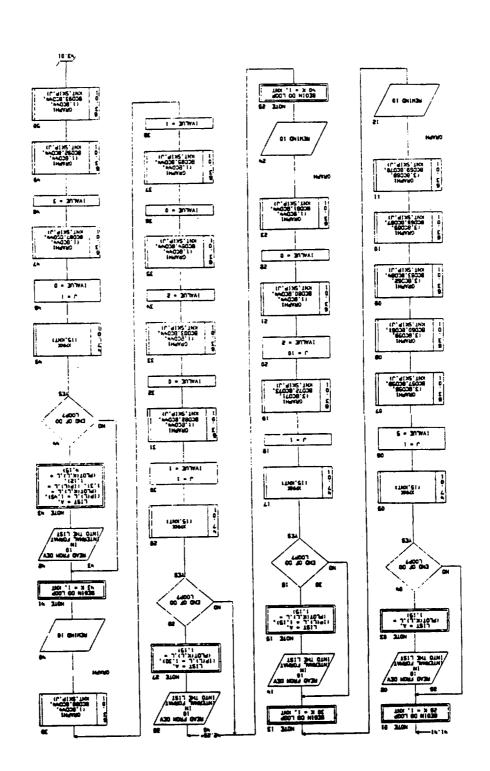
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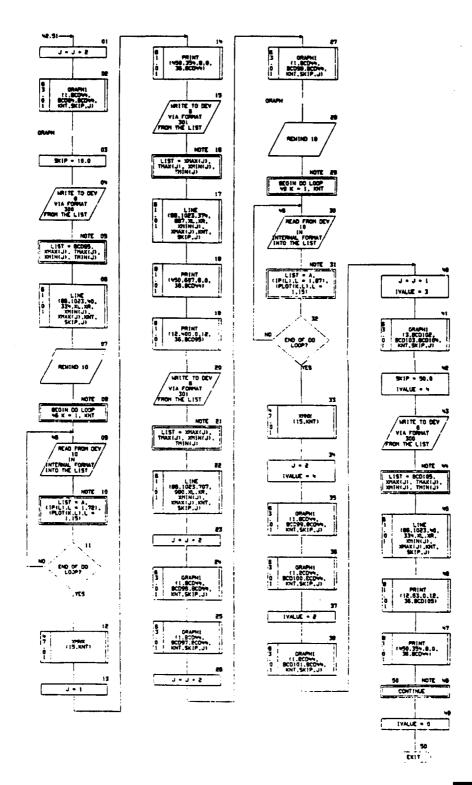
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, 401/2003, 421 (2003), 421/2003, (619/2003), 421/2003, (717/2003), BC093(9) ,8C09+(9) ,8C095(9) ,8C095(9) ,8C097(9) ,9C098(9) (e) (8000e, (e) (8000e, (e) 2000e, (e) 1800e, (e) 1800e, (e) (8000e, (e) (8000e) DINEMETER

BC088(91,8C087(9),8C088(9),BC088(9),BC070(9),BC071(9),BC072(9) .0073(9),00079(9),00079(9),00078(9),00077(9),00078(9),00079(9) .BC000191.BC0001(91.BC000(91.BC000191.BC00010).BC000191.BC000191 ,8C087(9),8C088(9),8C088(9),8C080(9),8C091(9),8C092(9),8C082(9) .BCD9+(91,BCD95(9),BCD98(9),BCD97(9),BCD96(9),BCD99(9),BCD109(9) (B) 2010103, (B) -800188(9) -800103(9) -800104(9) -800105(9) COMMINGRAP/PLOT, TIMEP, 1P. 15

OPENSION RECESS, ASSAUCES , ASHINGS , CHARGES , THENCES COPPION /GRAPHSE/ NL. NR. NHIN, NHAX, THIR, THAX

COPPER /COS/ IVALUE

DATA GCD1/38H XAD FT/SEC DATA BCDE/38H YAD FT/SEC DATA BCDS/30H ZAD FT/SEC DATA SCON/38H XTD FT/SEC DATA SCOS/38H YTD FT/SEC DATA SCOS/38H ZTD FT/SEC DATA SCOT/SSH XRD FT/SEC DATA BCDB/38H VRD FT/SEC DATA BCDB/38H 2RD FT/SEC DATA BCD10/30M XA FT DATA SCOIL/SSM YA FT DATA BCD12/38H ZA FT DATA SCD13/38H XT FT DATA SCOLS/38H YT FT DATA SCO19/38H 2T FT DATA SCOIG/38H XR FT DATA SCD17/38H VR FT DATA SCOIG/38H 2R FT

DATA SCD19/38H CHESKA GES/SEC DATA GCDES/38H CHESYA DES/SEC DATA REDRIZADA OPERZA DESZREC DATA REDER/30N CHERKY DEC/SEC DATA BCDES/38H CHESYT DES/SEC DATA BCDEN/38H CHEDZY DED/SEC DATA BCDES/38H CHESIST DEG/9EC DATA BEDES/38H CHECKY DEC/SEC DATA BCD27/38H DHESZR DES/SEC

DATA BCD29/38H PHA DES DATA SCORS/384 THA DEG DATA SCOTO/TEN PSA DEG DATA BCD31/38H PHT DES DATA BCD32/38H THT DES DATA BCD33/38H PST DES DATA BCD34/38H PHR DES

DATA BC035/38H THR DES DATA SCOSS/SSH PSR DEG DATA BCDS7/38H FSURAX LBS DATA BCD38/38H FSURAY LBS

DATA BCD38/39N F9UNZ LBS DATA SCOVE/38N FRUNTE LBS

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DATA SCONE/SEM FOUNTZ LES
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DATA SCOVE/30H FSURRY LES
DATA BODNS/38H FSUPRZ LBS
DATA BCD47/38H TSURAX FT USS
DATA BODYB/30H TSUMY FT LBS
DATA BCDV9/38H TSUNZ FT LBS
DATA BCDB0/38H TSURTX FT LBS
DATA BODSI/38H TSLRITY FT LBS
DATA BCD52/304 TSUHT2 FT LBS
DATA SCOSS/SON TSURRY FT LOS
DATA BC054/38H TSURRY FT LBS
DATA BCD95/38H TSUNFZ FT LBS
DATA BCDSS/384 FORCE ATTEN 1 LBS
DATA BCD97/38H STROKE ATTEM 1 FT
DATA BCDSB/38H VELOCITY ATTEN 1 FT/SEC
DATA BC099/38H FORCE ATTEM 2 LBS
DATA BEDSS/38H STROKE ATTEN 2 FT
DATA BOOKL/38H VOLCCITY ATTEN 2 FT/SEC
DATA BCD52/36H FORCE ATTEN 3 LBS
DATA BCD63/38H STROKE ATTEN 3 FT
DATA SCOBN/SON VELOCITY ATTEN 3 FT/SEC
DATA BCOBS/38H FORCE ATTEN 9 LBS
DATA BODSE/38H STROKE ATTEN 4 FT
DATA BCD87/38H VELOCITY ATTER W FT/SEC
DATA BCD68/38H FORCE ATTEN 5 LBS
DATA SCOSS/28H STROKE ATTEN 5 FT
DATA SCO76/38H VELOCITY ATTEM 5 FT/SEC
DATA BCD71/38H FORCE ATTEN 6 LBS
GATA BCD72/36H STROKE ATTEN 6 FT
DATA BCD73/38H VELOCITY ATTEN 6 FT/SEC
DATA 80074 / 9+1H /
DATA 80075 / 9*IH /
DATA 80076 / 9*1H /
DATA BCD77 / 9*1H /
DATA 80078 / 911H /
DATA 90079 / 9*IN /
DATA OCCIOC/36H RHTTA X Y Z FT
DATA GCDGL/36H AHRTA X Y 2 DEG
BATA SCOSE/SEN VARTA X Y Z FT/SEC
DATA BEDB3/38H DMRTA X Y Z DEG/SEC
DATA BCDB+/38H RHRTT X Y Z FT
DATA BCD85/38H AMRTT X Y Z DES
DATA BCDBS/38H WARTT X Y Z FT/SEC
DATA BCD87/36H CHRTT X Y Z DEC/SEC
DATA BODBE/38H RCS FORCE X Y Z ACTIVE VEHICLE
DATA BODDS/38H RCS TORQUE X Y Z ACTIVE VEHICLE
DATA ECDED/36H RCS FORCES X Y Z TARGET VEHICLE
DATA BCD91/38H ACS TORQUE X Y Z TARGET VEHICLE
DATA BODE / WI FOR WICE B. WETHE, WICH F. WILLIAGE, WIRE 1.
          4H-3 .2-IH /
DATA BODES / MI FOR MICE B. METHE, WEN F. MITHOE, MARS N.
          1 HI-S. B-HP
DATA SCOSH / WI FOR WICE -, WI- TA, WIRDET, WH F (N, WIDER-,
          WRIND, WI [-3, WI /
DATA BCD95 / NH FOR, NHCE -, NH- TA, NHROET, NH FIN, NHOER-,
          WERTING, WHI 4-6, WHE /
DATA BODDS / WH FOR WICE -, WIE RE, WALD F. WHENDE, WIRETA.
          WHRCET, WH 1-3, WH /
DATA SCOOT / WE FOR, WICE -, WIE RI, WHISE F, WILLIAGE, WIR-TA,
            4HRGET, 4H 4-6, 4H /
DATA GCDSG / HH LAT, WHCH E, WHOADS, HH 1-3, HH . E, HHSS . 35111 /
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CHART TITLE - NON-PROCEDURAL STATEMENTS

DATA BCOB9/38H ACTIVE INTERFACE TORGLES,FT LBS DATA BCD100/38H TANGET INTERFACE TORGLES, FT LBS DATA BCD101/38HTANGET FINGER INTERFERDICE DISTANCE

DATA BCD102 / WH FCA.WGRI , WH LBS.G-IH /
DATA BCD103 / WH FCA.WGRE , WH LBS.G-IH /
DATA BCD104 / WH FCA.WGRI3 , WH LBS.G-IH /

DATA BCD105 / WH THO, WHITT , WALDS 19-1H / FORMATTHHER, 'VARIABLE', 33X, 'MAXIMON VALUE', SX,'AT THE', SX,'HINIMON WALLE', SX,'AT THE')

FORMITTHDRY, BAY, 2 (4X, E14, 7, 2X, E14, 7))
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DINENSION PLOT(1110,15), TIMEP(1110), (P(11110)

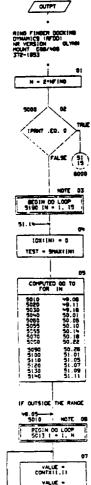
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DINENSION RECENS), MAXIVES MARINESS, THANKESS COMMON FORMERS AL, MR, MIN, MAXX, THIN, THAX

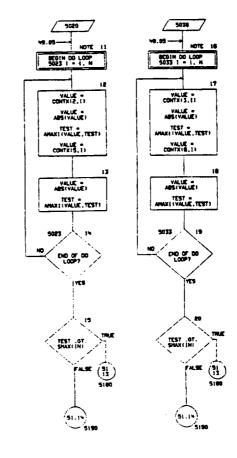
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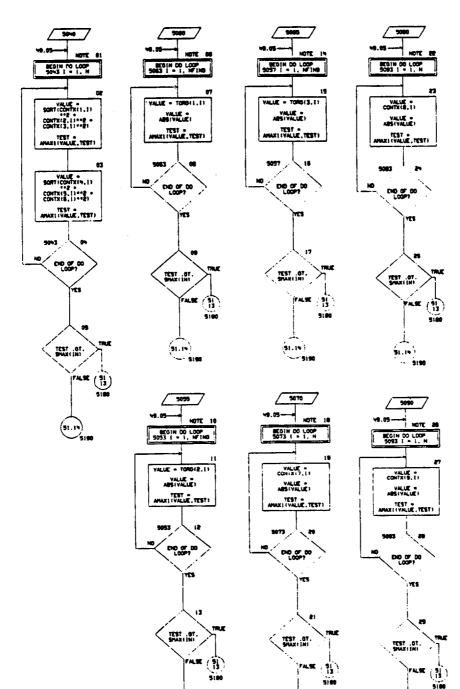
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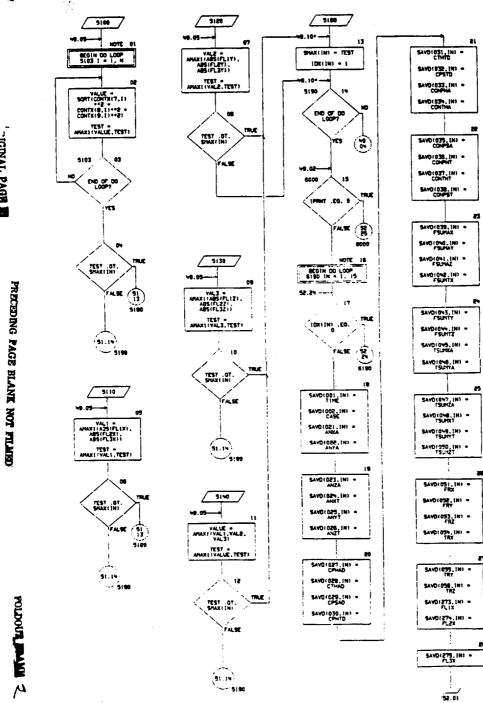
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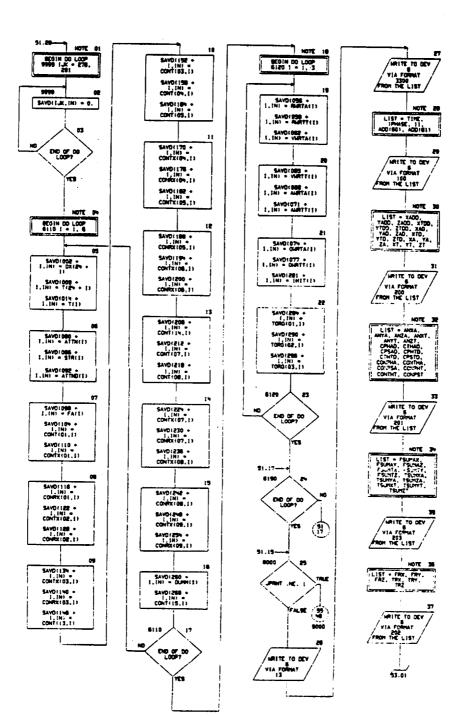
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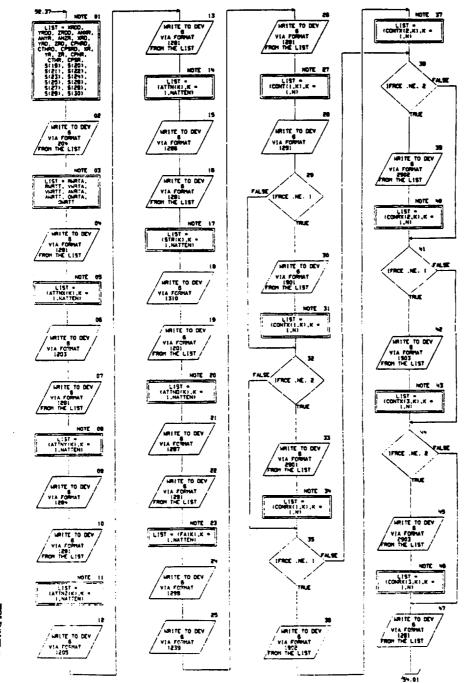
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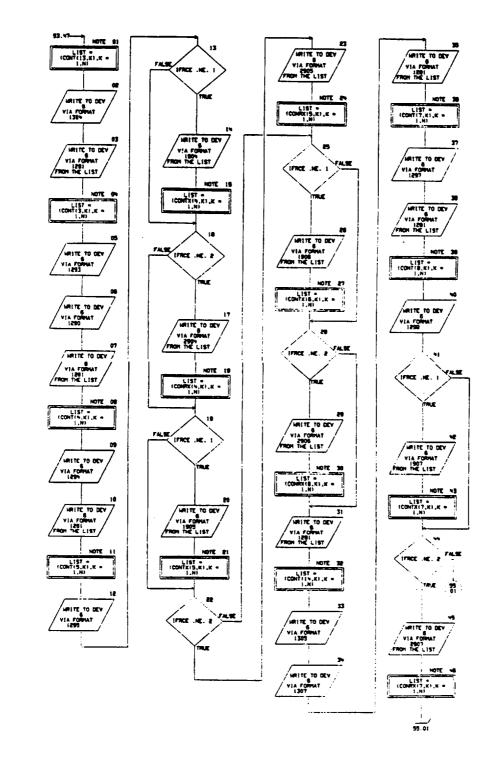
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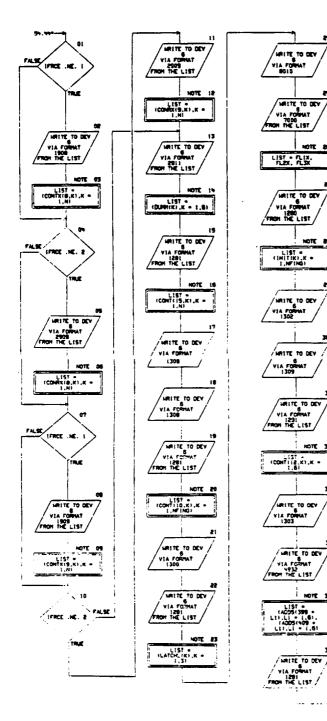
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VIA POPUAT 1311 ROH THE LIST

LIST - RE

WRITE TO DEV



LIST - TAL. TTI WALTE TO DEY VIA FORMAT HEITE TO DEV LIST -(FCARM(1),[= 1,3), 7HOTOR VIA FORTHAT 52.25-0000 EXIT

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HOTE 35

HRITE TO DEV /

Space Division
Rockwell International

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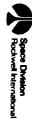
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74-CS-0023

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DIFFERENCE HATHING CONSTITUTION
 ,$188951
 ,ACD4 1881
DIRECTOR ATTRICES , ATTRICES , ATTRICES , ATTRICES , STRIES , PARCES
(85) INT. (85)XT, (85)LT, (85)XA, (85)LA, (85)AT, (85)BAT, (85)BRTA,
 , THE (88)
DIMDIGIO VARIZNOS), T(2005), A(15), B(15), C(50), D(30), E(15), F(18),
                  AA(25) .AT(30) .CO(10) .99(10)
COLUMN (CONTINUED ATTROPORTA, (CONTINUED ATTROPORTA, (CONTINUED)
COMONFINARIS,40) ART (3,20)
COMONULATOWALATON 3, 41. CLATCH (3, 26)
EQUIVALENCE (AGD (71) , XL) . (AGD (72) ,RADL)
DIREMETON ORLIN(3,31,V(3),V1(3)
                   , IHIT (20)
COULVALDICE (ORLINGE, E) . GREET
DIPENSION CONT(15,20)
EQUIVALDICE (ACCR(1), CONT(1,1))
COUTVALDICE (ADD(1), RR), (ADD(2), OFFUR), (ADD(2), OFFUR)
                   (ADDIN), (ADDIS), (ADDIS), (ADDIS), (YIR), (ADDIT), (ADDIT), (ADDIT)
                   738. (#1)00A), (ESA, (E))00A), (OPPA, (E) 00A), (BNEW, (B) 00A),
                 1, (AOD(15), TEPECT), (AOD(16), TPRO), (AOD(17), CHOP)
                    . (ACD (18) , SK)
                     (CYA. ($1)00A1, ($2(A. ()1)00A1, (00R, (81)00A1,
                     . (ADD(18).0(SC).(ADD(20).(START)
EQUIVALENCE (T(1), XA1, (T(2), YA1, (T(3), ZA1, (T(4), XT), (T(5), YT),
                      (ATCO ... (11), CHECKA), (1(0), CHECKA), (1(0), CHECKA),
                       (T(10).0%0X1).(T(11).0%0Y1).(T(12).0%0ZT).
                       (T(13), T(A), (T(19), P(A), (T(15), PSA), (T(16), TMT),
                       (T(171,PHT), (T(181,PST), (T(181,NP), (T(201,YP),
                       (102, (45) 7), (07, (25) 7), (08, (25) 7), (120) , (20) ,
                       (TIRS), HADI, (TIRS), YADI, (TIRS), EADI, (TIRS), HOIX,
                       (1(291,10),(1(30),270)
 COUPALDICE(T(St), MRD), (T(SE), MRD), (T(SS), MRD), (T(SH), MRD, (T(SH),
              YR1, (T(36), ZR), (T(37), THR1, (T(36), PSR), (T(36), PHR), (T(46),
         (95090, 1541), (96090), (1411), (96090)
                     .($(46),[HIT(1))
 , (07XG, (#)XD), (0ASC,(E)XD), (0AYC, (S)XD), (0AVC,(1)XD) 30KU,AYTUGS
                       OXY50, (0XIS), (0XIS), (0XID), (0XID), (0XIS), (0XIS), (0XIS)
                       ), (0X(9), OHEZAD), (0X(10), OHEXTO), (0X(11), OHEYTO),
                       (DK(12), OFE270), (DX(13), THAD), (DX(14), FHAD),
                       (DX(15), PSAD), (DX(16), THTO), (DX(17), PHTD), (DX(18), PSTD
                     1. (0X(191,XF0), (0X(20),YF0), (0X(211,ZF0)
                      . (DX(24), ZDD), (DX(25), XADD), (DX(26), YADD),
                      (DX (27) . ZADD) . (DX (28) . XTDD) . (DX (29) . YTCD) . (DX (30) . ZTDD)
EQUITALENCE (0X(3)), (000), (0X(32), (000), (0X(33), 2000), (0X(30), 0X(30))
                   , (DX (35) , DYRO) , (DX (36) , DZRO) , (DX (37) , T4RO) , (DX (38) ,PSRO)
                     (ORC39) , PHRO) , (ORC40) , (ORC30) , (ORC41) , ORC480
                    . (CX(NZ).OHEZHO)
 CONTINUENCE (AIR), MAI, (AIR), MAIAI, (AIN), YYIA), (AIR), ZZIA),
                       (A(B), XY(A), (A(7), XZ(A), (A(B), YZ(A), (A(9), OFF, JA),
                       CACIDILOFFICAL CACILLIRAL
 COLIVAÇÃO (8/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2), (7/2),
                       (8(8),XYIT),(8(7),XZIT),(8(8),YZIT),(8(9),OFFJT),
                        (B(10),0FFKT),(B(11),RT)
 EQUIVALENCE (C11), NATTENO, (C12), DAT, (C13), DT1, (C19), ALPHA)
 (1111), (1111), (1111), (1111), (1111), (1111), (1111), (1111),
 .(C(97),(S)(PL),(D(19),(HUNT)
                     (C(7),THMA),(C(19),THORO),(C(20),10(198)
  , (C(S),EXT),(SLOP,C(S))
 EQUIVALENCE (MPLOT, E (111)
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, (\$119) (PROSMA), (\$120) (PROSMA), (\$121) (PROSMA), (\$122) (PROSMA), (\$123) (PROSMA), (\$123) (PROSMA), (\$123) (PROSMA), (\$123) (PROSMA), (\$123) (PROSMA), (\$127) (PROSMA), (\$12



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05/22/74

AUT ON CHART SET - REDD.FLG REDD-FLON

PAGE 5

NATT TITLE - NON-PROCEDURAL STATEMENTS

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DIMENSION STICIO: FSKOIL(18) ,ATTN1(18)
 EQUIVALENCE ($105) . $71(1) | . ($(75) , F$(0)(L(1))
 EQUITALISEE (E(2), IPHASE). (E(3), STOP), (E(4), DELPP), (E(5), CASE).
                                                     (E(8),100APH),(E(7),00LP),(E(8),009LC),(E(9),UH),
                                                   (E(10).ICASE)
EQUIVALENCE (F(2), THESH), (F(4), A3), (F(5), A6), (F(6), KA1),
                                                  (F(7),A2),(F(9),A4),(F(9),A7)
 EQUIVALENCE (AA(E),THCOM),(AA(3),PHCOM),(AA(4),PSCOM),
                                                  (AA151,ARKA), (AA(6),ARYA), (AA(7),ARZA), (AA(6),ARPHA),
                                                  CAYT, (SIERAE, CAXT, (ELEAA), CAPPAE, (BEFAA), CARTON, CEEPAA)
                                                . (AACIS), TZA), (AACIS), (ABOARDA, (AACIS), (BANYA),
                                                   (AATIS) DBANZA) (AATIT) FXA) (AATIS) REACTA)
                                                     (AACIS), BANKA), (AA(20), KANYA), (AA(21), BANZA)
EQUIVALENCE (AT(2), ORNOR), (AT(3), DYRK), (AT(9), TRCST), (AT(5), DPK),
                                                   TATISE, ARKTE, CATITE, LARYTE, CATIRE, ARZTE, CATIRE, ADMITE.
                                                     (ATCIO), ADTHT), (ATCIL), ADPST), (ATCIR), OBANGCI),
                                                     (AT(13), DBANYT), (AT(19), DBANZT), (AT(15), THOONT),
                                                   (ATCIS), PHCONT), (ATCIT), PSCONT), (ATCIS), REACTT),
                                                   :TSM8,(15)TA),(TYMAB,(05)TA),(TDMAB,(01)TA)
                                                   CTX3, (25)TAL, (TX7, (45)TAL, (TY7, (ES)TAL, (TX7, (55)TAL
                                                   ITXAM, (85)TA), ITXAM, (75)TA), (TXAM, (85)TA)
                                                  (ATTES) . (RCS) . (ATTES) . (VEH)
EQUIVALENCE (VARILITATIS), (VARIES) . BISTO . (VARISE) . CITT.
                                                  (VAR(81),001)),(VAR(111),E11)),(VAR(126),F(1)),
                                                     (VARCE38).AACE)).(VARCE8E).ATCE);(VARCE9E).COCCI);
                                                   1111, (1151RAVI, ((1155,1105)RAVI
DIMENSION MAXR(3),RCC3(3),MAXRA(3),RCC3A(3),MXXA(3),RCP(3),
                                         GAMAM(3,3), GAPEN(3,3), XTXAA(3), RVT(3), RVTA(3), SBARTA(3)
                                        . (E) AROY, (E) ROY, (E) ARY, (E) ARY, (E) ATRIR, (E) SDOR.
                                           . (E) TRV., (E) ATOV., (E) AATV., (E) ATO., (E) ARV., (E) ATV., (E) ATRALY
                                           VRTT(3),SYORT(3),ORT(3),GANDN(3,3),
                                                                                                                                                                                                                             GAMTH(3.3)
                                        , (E) AOV, (E) TD, (E) AO, (E) ATRIA, (E, E) PRINTAD.
                                                                                                                                                                                                                                                 OMRTATS1.
 XTMR(3), XTXRT(3), RCL5(3), RCL5(3), SRCL5T(3), RRTT(3), AMRTT(3),
 VOT($1, VORT($), VMRTT($1, OMRTT($)
 EQUIVALENCE (RCG3(1),ADD(1)),(GAMAH(1,1),GAMAL(1),(GAMEH(1,1),
                                                   GAMETER, (GAMMITE, 1) . GAMMITE, (T(40) . OR(1)) . (OA(1) , T(7))
                                                 (1) TIMO, (1, 21HTHMO), (11DMA), (1, 21HOHA), ((811T, (1)TD)),
                                                 . (RCL511).ADD(111)
 COPPON/OUTN/XAXR, RVT, XTXR
 COMMON YAR
 COPPON/RET/ILOSS
  COMMITTANES GAMAII, BAMAIR, GAMAII, GAMARI, GAMARR, GAMARI, GAMARI,
     , (ETHAD, ESTHAD, SSTHAD, SSTHAD, SSTHAD, SSTHAD, SERMAD, SEAMAD, SEAM
     GANTER, GANTES, GARRIE, GARRIE, GARRIE, GARREE, GARREE
     GAPRIS, GAPRIS, GAPETT, CAPETT, GAPETT, GAPETT
     . IECHAD. ESCHAD. SSCHAD. I SCHAD. ELCHAD. ELCHAD. ELCHAD. SESHAD
     CAMOSE.GAMOSS.GAMOSI.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GAMOSE.GA
     EEBNAD, SERNAD, IEBNAD, ESZNAD, SSENAD, EIBNAD, EIBNAD, SIENAD, 112NAD.
COPPONE INITAL/ARMI. TIPEPP. IPULL, JTESTH. SLOPE
     .PRCCEA.TLSA.11.3KA1.THESHI,CONST
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COMMON AND LEYSTMA, CTMA, SPMA, CTMA, SPSA, CTMA, STMT, CTMT, SPMT, CTMT, SPST, CTMST COMMON (MARCH (LATH, RPZ, NLM, RPS, NLM, FLATCM, TLATY, TLATZ, THUR, THUS

TSUMYT.TSUMZT, FSUMTX, FSUMTY, FSUMTZ

COMMONICALCUIFO, FC, F1, TORI, FS1, FS2, FS3, FCR1, FCR2, FCR3, ETA1, ETA2, ETA3, FR114, FRT24, FRT34, TS1, TLS2, TLS2, FR118, FRT28, FRT38, VELB1, VELB3, VELB3, VELP, FR110+, FR01, FR02, FR03, FR08CL, COMMONITO, VARB1, TARRY, TARRY, TARRY, TARRY, TARRY, TSLRYA, TSLRYA,

COMMON/OUT/FGX,FGY,FGZ,TORX,TORY,TORZ,STRB1,STRB2,STRB3,STRPR,

COPPON/RECAL/S



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CHART FITLE - HON-PROCEDURAL STATEMENTS

FCX.FCY.FCZ COPHON/PULL/RETRAC COPHON/HOM/HOM

COPPON ADDRESS AUT 1981

SHTIA, WITTA, MITTA,

COMMONITIRATINGO

.RSF(3.4).RS(3.4)

CONTINUEDRA/THAPE, PAMPE, PAMPE, THITPE, PHITPE, PSTPE CONTINUAMORT / MARRICA, HANDYA, HANDZA, THINKA, THINKA, THINKA

COMMUNICALINATINE, ONC 1981, ADDS (1990) COMMUNICAMOLDRASTINE, CTINE, SPINE, CPINE, SPINE, CPINE COMMUNICACIONALEMA, FINE, TREE, TRE

COPPONYTRANSFORE LORGE. ORSE, ORSE,

**PMT "LEIS.6." THT "LEIS.6." PST "LEIS.6." FORMATH PSARTLEIS.6." PSARTLEIS.6." PSARTLEIS.6." PSARTLEIS.6." PSARTLEIS.6." PSARTLEIS.6." PSARTLEIS.6." PSARTLEIS.6." TSARTLEIS.6." TSARTL

OHENSION TREATS, (M.E. S. SINI TO. (OS. STATE HOLSENDRO

SD 74-CS-0023

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PLANT ELOGISM
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OPPENSION TATESTATES, TAICESTATECES, ACOSES
        CORPON/STRV/TRT (3,28)
        EQUIVALDICE (C123) . REX1 . (C124) . RER1
        DOUBLE PRECISION TILLITIES
        COPPON /TITLES/ TTLIES, TTLEES)
        COPPON /CA/ VCASR(3,10),VCASB(3,10),CABL(3,10),FCAB(3,10),
                   THOTOR,FCABH(18)
        CONTRACT CONTRACT CONTRACT CONTRACT ADDRESS A LETTOR
                     .061571101
        EQUIVALENCE (905.0(91)
        DIFFERSION SUPPRISE
        COPPON /OUTSTY/ ANNA,ANYA,ANZA,CONSHA,CONSHA,CONSSA,
                     MOST, MYT, ANZT, COMPST, CONTINT, COMPST
        COPPEN /SAVC/ SAVD(30E.15), $MAK(15), 10X(15)
        COPPON /REST/ CPMD,CTMD,CPSAD,CPHTD,CTMTD,CPSTD,
                      NOR, MYR, AKZR, CPHRO, CTHRO, CPSRO,
                      MRTA, MRTT, WRTA, WRTT, MRTA, MRTT,
                      OMTA, OMTT, IPMIT, JPMIT, JPLOT,
                      00m,PLIX.PL2X.PL3X.PLIY.PL2Y.PL3Y.PL12,PL2Z.PL3Z.
                      MOL.RSF, TAI,TTI
        COPPON /PEK/ TORGIS,81
        REAL ... LATCH
        COPPON /FOLLY/LATOR-(3)
13
        FORMAT (1911)
1300
        FORMATION TIMECIS.6.00 PHASE.118.30 11.115.50 N. E13.8.
        SH THEIRIS AT
        FORMATC' XADD', E13.8, ' YADD', E13.6, ' 2ADD', E13.6,
               1 XT001 .E13.6.1 YT001.E13.6.1 27001.E13.6/
               " XAD ",E13.8," YAD ",E13.8," ZAD ",C13.6,
               " XTD ".E13.6," YTD ".E13.6," ZTD ".E13.6/
               " XA ".E13.6," YA ".E13.6," ZA ".E13.6,
               " XT ",E13.8," YT ",E13.8," ZT ",E13.8 1
        FORMATC! 0XA ".E13.6." 0YA ".E13.6." 0ZA ".E13.6.
               18.813,1 TS0 1,8.813,1 TV0 1,8.813,1 TX0 1
               " PHAD", E13.8, " THAD", C13.6, " PSAD", C13.6.
               " PHTD",E13.6," THTD",E13.6," PSTD",E13.6/
               " PHA ".E13.6." THA ".E13.6." PSA ".E13.6.
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AUTO-FLOR

PAGE SE

Space Division
Rockwell Internations

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FORMATE FRO: 1,013.8.1 FRY 1,013.8.1 FRZ 1,013.8.1 1 RR: 1,013.8.1 TRY 1,013.8.1 TRZ 1,013.6.1

FOLDOUT, MICHAEL

```
FORWATE: XM001,E13.8,1 YM001,E13.8,1 ZM001,E13.8,
               * MOST .E13.6.* MYR* .E13.6.* MCR* .E13.6/
               1 X00 1,613.6,1 YRD 1,613.6,1 2RD 1,613.6,
               * PHRD*,E13.6,* THRD*,E13.6,* PSRD*,E13.6/
               1 MR 1,613.6.1 WR 1,613.6.1 ZR 1,613.8.
               " MR ",EI3.6," THE ",EI3.6," PSR ",EI3.6/
               " FCAR", E13.6, " FCAY", E13.6, " FCAZ", E13.6,
               * FCTX*,E13.6,* FCTY*,E13.6,* FCTZ*,E13.8/
               " TCAN", E13.6, " TCAY", E13.6, " TCAZ", E13.6.
               * TCTX*,E13.6,* TCTY*,E13.6.* TCTZ*,E13.6.)
        FORMATI' - RORTA1',E18.8,' - MORTA2',E18.8,' - MORTA3',E18.8/
                   MATTL', E16.8, ' PARTT2', E18.8, ' MATT3', E18.8/
                   VIRTAL' .E.B.B.' WRTAZ' .E.G.B.' VIRTAZ' .E.B.B/
                   WATTI '.E18.8.' WATTE',E18.8.' WATTS',E18.8
                   AMRTAL',EIB.B.' AMRTAS',EIB.B.' AMRTAS',EIB.B/
                   THRTAL',E18.8." AHRTT2',E18.8." AHRTT3',E18.8/
                   OHTA1',E18.8,' OHTA2',E18.8,' OHTA3',E18.8/
                  OMRTT11,E18.8,1 OMRTT21,E18.8,1 OMRTT31,E18.8)
1263
        FORMATCIMO, 'ATTNOCIED"
        FORMATION . 'ATTNY(1)')
1284
1205
        FORMATCIN+, 'ATTRZITI'
        FORMATISH+, ATTN([11)
1296
1310
        FORMATCINA, STRILL'S
1287
        FORMATION . "ATTNDICE"
1298
        FORMATISH+, "FAILES"
        FORMATION 10X,8515.71
1851
        FORMATICS CONTACT BETWEEN RING FINGERS AND TARGET FINGERS 13
1209
        FORMAT (1H+, FINGER-R')
1291
1901
         FORMATTIN , 'FORCE-FFTX' . BELS. 71
2901
         FORMATCIN , FORCE-FFRX . BE15.7)
         FORMATCIN . FORCE-FFTY' .6E15.71
1902
         FORMATCIN . FORCE-FFRY' . BE15.7)
2002
         FORMATCIM , FORCE-FFTZ . 8E15.71
1903
2903
         FORMATCIM . FORCE-FFRZ . BE15.71
1309
         FORMAT(1H+.:D15-1')
1293
         FORMAT (1H+, FINGER-T1)
         FORMATTIMAN CONTACT BETWEEN RING AND TARGET FINGERS 13
1290
         FORMAT ((M+, 'ANGLE-R')
1294
         FORMAT (194+, "FINGER-T")
1295
         FORMATTIM , FORCE-NETKY , 0E15.71
1904
         FORMATEIN . FORCE-RERX . BE15.71
2904
         FORMATCIN . FORCE-RETY . SELS.7)
1905
         FORMATION . FORCE-RERY (8E15.7)
2905
         FORMATION , FORCE-RETZ' , 8E15.7)
1906
         FORMATICH . FORCE-RFRZ* . BE15.71
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1305
         FCWAT(1H+, '015-2')
         FORMATI:***** CONTACT BETHEEN FINGERS ON RING AND TARGET RING! )
1307
1297
         FORMAT (1H+, 'ANOLE-T')
1290
         FORMAT (1H+, 'FINGER-A')
1907
         FORMATILM , FORCE-FREX1.8E15.79
2907
         FORMATEIM , FORCE-FRRE . BE15.71
1938
         FORMATION , FORCE-FRTY1, 8E15.79
2978
         FORMATION , "FORCE-FRRY", 8E15.71
1909
         FORHATCIN , FORCE-FRIZ', 8E15.71
         FORMATCIN . FORCE-FRRZ* .8E15.71
8999
          FORMATC: RENG TO RING CONTACT LOADS:/
                " FREX!",E12.5," FREX2",E12.5," FREX3",E12.5.
                 " FRRX4",E(2.5," FRRX5",E(2.5," FPRX6",E(2.5.)
1306
         FORMATION+, 1015-311
1308
         FORMATI ----- LATCH DISTANCE AND FORCES 12
 1300
         FORMAT (1H+, DELTAL!)
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CHART TITLE - NON-PROCEDURAL STATEMENTS

FORMATCHA," LATCH."

FORMATI' LATCH LOADS' / BEARING: ,7x, 3E17.6/)

FORMATCH .9X.91131

FORMATIC INTERACTION FORCE ON RING EXCLUDING ATTENDATOR FORCE FORMATCINE, 'INIT')

FORMATI' *** CLERENT MAK ATTHEMATOR FORCES FOLLOWED BY HIN ATTEMAN FORMAT (114. FTM. TRR.) 1303

ATOR FORCES **** / 1H 0E15.8/1H 0E15.61 FORMT(1H+. 'TA1, TT1')

FORMATIIN , BE15.81

FORMATTIN TARGET FINGER DISTANCE FROM CON STRUCTURE .) FORMATI IN CABLE RETRACTION NECHANISMY IN . 1312

TENSION FORCES: ,5X, 3E14.77.1H . 'HOTOR TOROLE ',5X, E14.7) FORMATCIN /) Ĕ

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FOLDOWN FORMA

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55/28/7v

DIMENSION PLOTELLIO, 151, TIMERELLEO1, IPELLEO) CORTON/GRAP/PLOT, TIMEP, 1P, 15

DIPENSION BCDX1(9), BCDX2(9), BCDX3(9)

COPPONICAS/CASE

DIMENSION VARIENGO

DIMENSION VARIEN COMMON VAR EQUIVALENCE (VAR(190), IVEN) COPPON /TITLES/TLI(12)

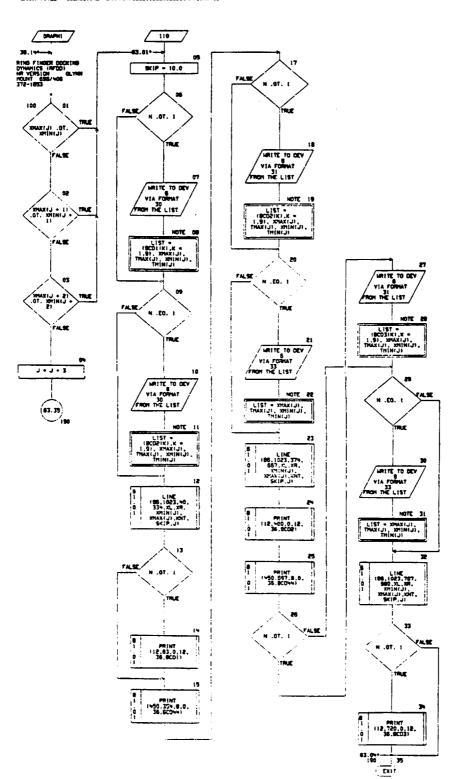
DATA BEDXI / WH DO, WEKIN, WE DY, WALMI, WES . WI-

MASE , WASE , WASECO, WADDS , SOIH /
DATA BECOKS / WH TIM, WE - , WASECO, WADDS , SOIH /
DATA BECOKS / WH DO, WAEKIN, WAS DT, WANNII, WES , W

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DINDIGION BCD1(8), BCCE(8), BCD3(8), BCD44(8), AND X01014(43), X04X(43), THIN(15), THAX(15)

COPECH /ORAPIC/ NL.XR.XMIN,XMX.TMIN,TMX
DATA BCDV+ / WH TIH,WE - ,WEECO,WHOS 19-1H /

FORMATINGER, SAN, ELWA, ELW. (19.7) FORMATIN EX, SAN, ELW. (19.7) FORMATIN EX, SAN, ELW. (19.7) EX, (19.7)

8 A R

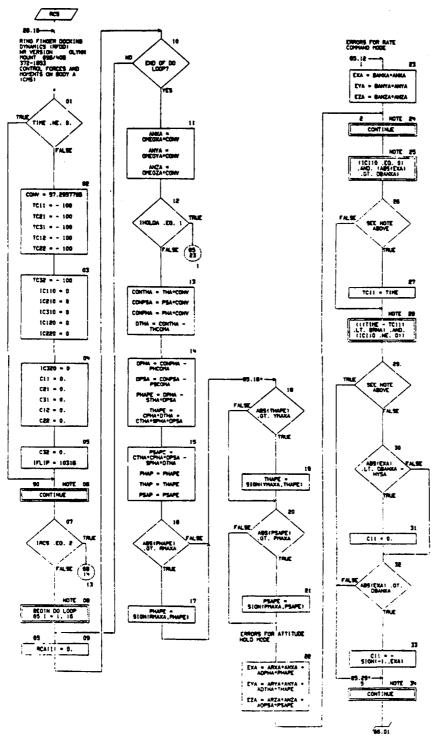
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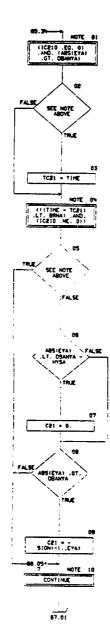




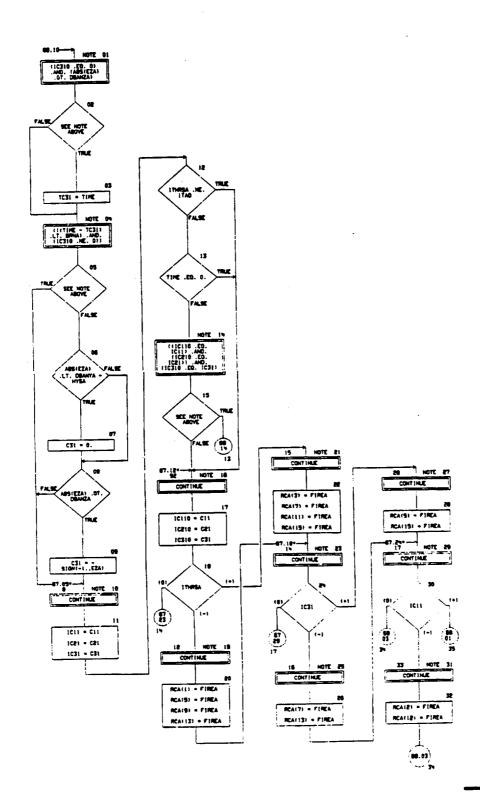
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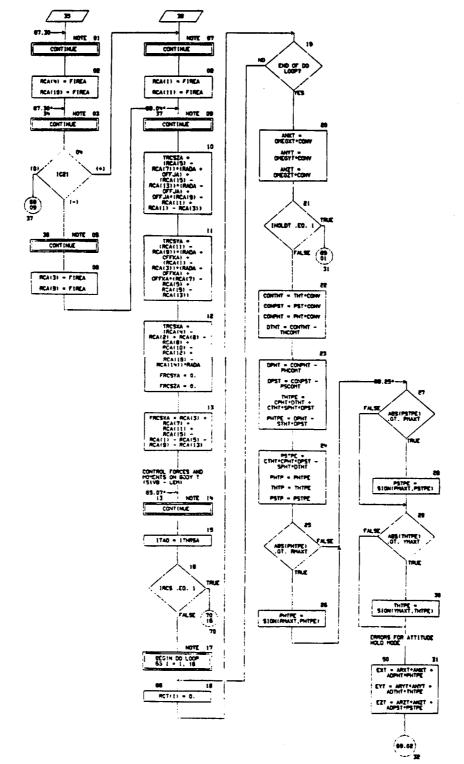
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10150 - 015 10550 - 055 1C320 - C32

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(ICRES .EG. S) .AND. (ABSIETT) .GT. CEANTT) MOTE 83 TOR - TIME HOTE 16 NOTE 26 SEE HOTE TC12 - TIME (((C120 .EQ. (C121 .A/D. (1C229 .EQ. (C221) .A/D. (C321 .A/D. ABSIEYTI .LT. DEANYT -ABSIEZTI LT. OBANZT HTST ne 😗 muz 👸 C22 . 0. C32 - 0. CIE . 0. C22 - -S19H(-1.,EYT) C32 ... \$10H1-1..EZT) IC15 - C15 1055 - 055 1035 - 035 \$10N(-1..EXT) ACT(7) . FIRET

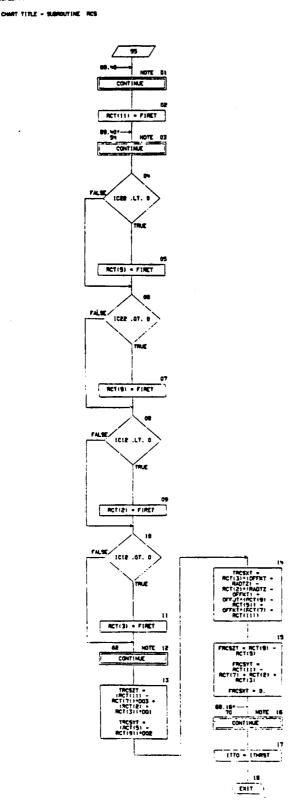
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DIFFERENCE VARIZAGES, (2005), ACESS, (2016), (2005), (2015), FC(19), F AA(25),AT(30),CO(10),98(10)

RCA(18),RCT(18),S(8885),ADD(100)

. (TY. (E)T), (TE, (4)T), (AZ, (E)T), (AY, (S)T), (AX, (1)T) 3DGJ.W (TIS),271,(TIT),OHEMA),(TIS),OHEMA),(TIS),OHEMA), (T(10), GHESST), (T(11), GHESYT), (T(12), GHES2T). (TELS), THE CELLS COMMITTEE CONT. (CELS), THE CONT. (CELS). (T(17),FMT),(T(18),FST),(T(18),MP),(T(28),YP), (1021),291,(10281,301,(10231,401,(10241,201, (T(25), XAD1, (T(26), YAD1, (T(27), ZAD), (T(28), XTD). (7129), (08) 11, (077, (85) 7)

EQUIVALENCE (AIR), MAN, (AIR), MINA, (AIR), , IALT'O, (E)A), (AITY, (E)A), (AIEX, (T)A), (AIEYK, (B)A) TATION, OFFICAN, TATION, RAT

EQUIVALENCE (8(2),18(1),(8(3),32(1),(9(4),4Y(1),(8(5),2Z(1), (8(8), XYITI, (8(7), XZITI, (8(8), YZIT), (8(8), OFF, IT), (B(10),0FFR(T),(B(11),RT)

EQUIVALENCE (C(2),T(P),(C(3),SC),(C(4),APR.1),(C(5),PA), (C(8),3LST),(C(7),8T),(C(8),SA),(C(8),PB),(C(19),3LCS) . (C(11) .00) . (C(12) .3L1) . (C(13) .FC) . (C(19) .3LC); (C(15), HAS) , (C(16), HER) , (C(17), DA) , (C(16), DL) .(C((9),THORO),(C(80),19((56) .(近fA.C(21)),(TARK.C(22))

EQUIVALENCE (D(2), PREPR), (D(3), CSTOP), (D(4), (D(4), (D(5), OR)F). (DIS), PRESH), (DIC), STOPPR), (DIS), FCOND), (DIS), CADI), (0116).CK1).(0(1).STOPSH).(0(12).PMJ).(0(13).FULPRE). (D(14),CA(1),(O(15),E11),(D(16),E12),(D(17),FCOP) . (D(181.ADHU)

EQUIVALENCE (E(E), IPMSE), (E(S), STOP), (E(4), IPLOT), (E(5), ITABLE), (E(8), (ORAPH), (E(7), OELP), (E(8), DESLC), (E(9), UH), (ECID) TEASE)

EQUIVALENCE (F(2), THESH), (F(3),H), (F(4),A3), (F(5),A5), (F(6),KA1), (F(7),A2), (F(8),A4), (F(9),A7)

EQUIVALENCE (AA(2), THOOPA), (AA(3), PHOOPA), (AA(4), PSCONA), . IAACS) . IBIAN . IAACS) . IA CADAR, CELLAND, CARTON, COLLAND, CANTON, COLLAND, (AA(18),FIREA), (AA(18), \$RNA), (AA(19), OBANKA), TAATIS), DRAWAS, TAATIES, DRAWAS, TAATISS, TIMEAS, (AATIB), (ESTAN, TARTIS), (BIDAS), TATORE, (BANYA), (RI, (\$5)AA1, (ASWE, (15)AA1 CAKATY, (ESTAA), (AXAPR, (#STAA), (AKAPR, (ESTAA),

CTIME, (E)TA), (T3N), (ATTA), (STOAR, (E)TA), (YTOAR, (S)TA) SCIENTIAN (STORE) . (ATCEL, ADCT), (ATCT), ARYT), (ATCEL, (ATCE), (ATCEL, (ETTA), (TIDMED, CELITA), (TEROA, (11)TA), (THTOA, (BITTA) (ATTIS), DRAWYTI, (ATTIS), (ATTIS), THEORTI, (ATTIS), PHOONT), (ATTIT), PROONT), (ATTIS), REACTT), (TSW8, (15)TA), (TYW8, (05)TA), (TSW8, (81)TA) (T3HIT, (ESITA), (E00, (#S)TA), (\$00, (ESITA), (100, (SS)TA) (TXANY, (85)TA), (TXANY, (75)TA), (TXANG, (85)TA) (ATTES), IRCS1, (ATTES), IVEHI

EQUIVALENCE (\$(1),C(1),(\$(2),C(2),(\$(3),C(3)),(\$(4),C(2)),(\$(5),C(2)) ,(\$(8),C32),(\$(7),TC(1),(\$(8),TC21),(\$(9),TC31),(\$(10),TC(2), (\$(11),1C22),(\$(12),TC32),(\$(13),1C110),(\$(14),1C210),(\$(15), [C3101, (S(10), (C120), (S(17), (C220), (S(18), (C320) , (\$129),FRCSXA), (\$120),FRCSYA), (\$121),FRCSZA), (\$122),FRCSKT), (\$(83),FRCSYT),(\$(84),FRCSZT),(\$(85),TRCSXA),(\$(86),TRCSYA), (\$127)_TROSZA)_(\$128)_TROSET)_(\$129)_TROSET)_(\$130)_TROSET)_ CECUCHI, LEDREN, CECSE), LEDREN, CECSE), CARRIER, CECSE), LACOTT

. (5(46), (TAO), (S(4)), (TTO) (1200, (87) 00A), (A206, (27) 00A),

EQUIVALENCE (VARCE), (CED B. (BEDRAY), (CED A. (CED RAY)) TYARCRES, (CELLS, CLEES, CLEES, CCDC, CLEES, FILLS,



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(VAR(138), AA(1)), (VAR(181), AT(1)), (VAR(181), CO(1)) (VAR(201), SS(1)), (VAR(211), T(1))

COPPON YAR

CONTON/EFLEX/TIME, DX(150), ADDS(1000)

CANTER, CANTES, CANTIL, CANTIL, CANTIL, CANTEL, CANTER, CANTEL, CANTEL ONASS.ONASS.ONEII.ONEIL.ONEIS.ONEZI.ONEZZ.ONEZS.ONESI. COPPONITRANS/ GAMAII. DAMAIE, GAMAIS, BAMAZI, GAMAZE, GAMAZI, GAMAZI, Ganaze. Bahabb, Bahtil, Bahtil, Bahtib, Camtei, Camtee, Bahteb, Bahtei,

ONETE, GWESS, BAYDI I , BAYDI 2 , GAYDO 13 , GAYDO 21 , GAYDOZ 2 , GAYDOS 1 , GAPOSE, GAPOSS, GAPICII, GAPICIE, GAPICEI, GAPICEE, GAPICES, GAPICEI,

OAHC32.GAHC33.GAHP11.GAHP12.GAHP21.GAHP22.GAHP23.GAHP31. CAPTE, CAPPES

COPPON INITAL / ANNI, TINEPP, IPULL, JTESTW, SLOPE COPPON/RECAL/S

.PROBEA, TLSA, 11, 1KA1, THESHI, CONST

COPPONICALCUIFB.FC.F1,TOR1.FS1,FS2,FS3,FCR1,FCR2,FCR3,ETA1. COPTON /LOO/YAPHI.YAPPE,YAPPG.ALCBI,XLCB2,ALCB3

etar.etas.frtia.frtza.frtja.1lsi.1ls2.1ls3.frtib.frtzb.frtjb. VELBI, VELBE, VELB3, VELP, FRICP, FRCI, FRC2, FRC3, PROSEL

COMPON/ANOLE/STHA, CTHA, SPHA, CPHA, SPSA, CPSA,

STHT.CTHT.SPHT.CPHT.SPST.CPST

COPPON/ERR/THAP, PIMP, PSAP, THTP, PHTP, PSTP

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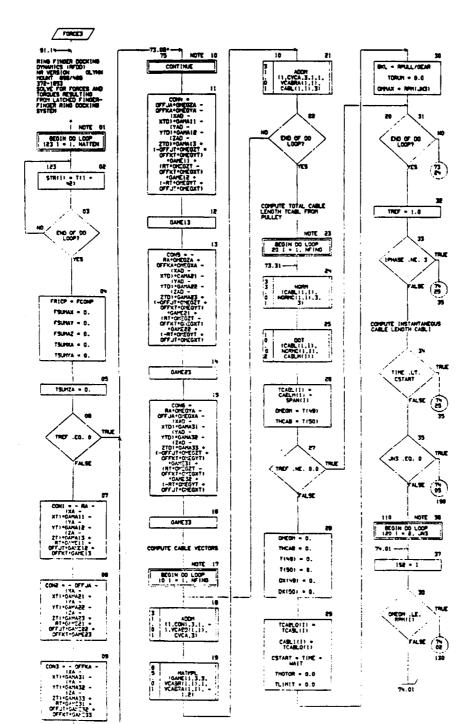
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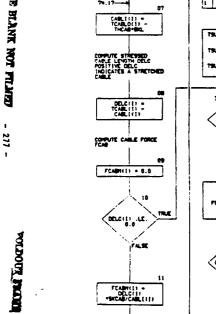
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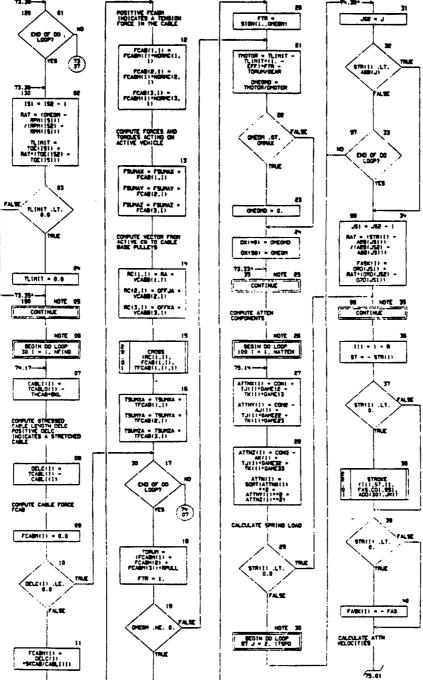
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/ATTMCLI*ATTMCLI TSURYA - TSURYA - FAIL *I-RA-ATTNZ[[] + (OFFICA -AK([])-ATTNX[]) /ATTNI[] TSUNZA = TSUNZA = FACI)

*(RASATINYIE) = (OFJA + AJII)*ATTNK(I)

/ATTN(I) ATTREED ATTREE END OF DO ATTNOILL =
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ATTNOILL = -FSUMTY -- FSUMAX*GAMRII -- FSUMAX*GAMRII -- FSUMAX*GAMRII -- FSUMAX*GAMRIZ -- FSUMAX*GAMRIZ -- FSUMAX*GAMRIZ -- FSUMAX*GAMRIZ -- FSUMAX*GAMRIZ CALL TABLE LOCKUP FOR DAMPING FORCE TSUMET - TSU FSUMTZ + FSUMAX GAMMI3 FSUMAX GAMMI3 FSUMAX GAMMI3 FSUNTY-GANTIES - ISS TATES - AST TATES - THE STRUCT - 1* ATTHELY .OT. FRUNTZ*GANTELL + (YA - YT)
+1-FRUNTX*GANT39 FSURTY-GAMT131 FSUNTZ+GANTER: + (ZA -ZT) +(-FSUNTY+GANT33 FAD(1) - 0. SEGIN DO LOOP + FSUNTZ+GANTZS) 124 FAILL + FADILL + FASKILL + FFRICP DX(1 + 42) = FRIMAN - FRIMAN -ATTHICITIZATTHITI FAILI YES

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                           AA(25) .AT(30) .CO(18) .SS(10)
                             .A00(1991,C01(10),981(19)
   CESTARA, (CETATE, (CETATE, (CETATE), (CETATE), (CETACE)
   ATTIO 1891 ,FAD (20) ,FA (20) ,AJ (20) ,AK (20) ,TJ (20) ,TK (20) ,TH (20)
   CAPILIA, (#13), (TO, (E13), (AO, (E13), (IGSTAK, (E13), SHELAY LUB
   .(C(8).THMA).(C(9).PRELD1).(C(19).DELPRE).(C(11).BRATE)
  .(C(12),A11,(C(13),B1),(C(19),C1),(C(15),EXRATE),(C(16),FC00)
                              (C(18).F1), (C(81).DI), (C(82), VO), (C(83).8YZ), (C(84), ADI
  . (TY, (E)T), (TK, (#11), (AS, (E)T), (AY, (E)T), (AK, (E)T) EDICLANTION
                                (AZDEND. (E)1), (AYDEND. (E)1), (ANDEND, (T)1), (TS. (E)1)
                                (TC101.0E0XT),(TC11),0E0XT),(T(12),0E0XT),
                                 CTCLES . THAT . CETTES . PHAT . CECTES 
                                 (TC17),PHT), (TC18),PST), (TC19),MP), (TC80),YP),
                                (CS. (#SIT), (OY. (ESIT), (OX. (ESIT), (PZ. (ISIT)
                                (OTK, 19517), 10AS, 175371, 10AY, 185171, 10AK, 185171
                               (TI25), (TD), (T(36), 2TD)
                              .(OX(19).XPO).(OX(20).YPO).(OX(21).ZPO).(OX(24).ZDO)
 EQUIVALENCE (ACC) (78) ...A(1) . (ACC) (81) ...(CO) (81) ...(ACC) (91) ....(81)
CAISS, (EIA), (AIVY, (#IA), (AIXX, (EIA), (AME, (SIA), (AIS), (AIXX, (EIA),
                               (ALE), KYTA), (A(7), KZIA), (ALE), YZIA), (A(9), OFFUA),
                                (A118), OFFICA), (A(11), RA)
EQUIVALENCE (8(2),39(1),(8(3),30((1),(8(4),47)(1),(8(5),222(1),
                               (8(8), XYITI, (8(7), XZITI, (8(8), YZITI, (8(9), OFF, IT),
                               (8(10),0FFKf1,(8(1)),RT)
EQUIVALENCE (E(2), IPHASE), (E(3), STOP), (E(4), IPLOT), (E(5), ITABLE),
                              (E(8),1GRAPH),(E(7),DELP),(E(8),DESLC),(E(8),UN),
                              (E(10),(CASE)
EQUIVALENCE (F12), THESH), (F13), N), (F14), A3), (F15), A5), (F16), KA1),
                              (F17),AE),(F(8),A4),(F(9),A7)
 COLIVALENCE CVARCES, ACCESS, AVAILABLE, SCIENCE, CORRESPONDED,
                              COLTE, GRIDANY, CCCCC, CLIDANY, CCCCC, CREANY
                               (VAR(136), AA(1)), (VAR(161), AT(1)), (VAR(191), CO(1)),
                              (VAR(201), $$(1)), (VAR(21), T(1))
EQUIVALENCE (ACC150), CKD1, (ACC151), 9HID1, (ACC152), ACC1, (ACC153), ACC
N) . (ADD (5%) . R) . (ADD (55) . HCO)
COMMON YAR
COMMON/EFLEX/TINE, OX (150) , ADDS (1000)
DIMENSION CONT(15.20)
EQUIVALENCE (ACCS(1), CONT(1,1))
COPPORT ADDRESS ADD
COPPON /ADDLE/ ALF(79)
OINENSION ABBILOT, ORDITOT, SERVICE), CORRIGO, RPHOIST, TOEVIS
EQUIVALENCE TALFIELD , ABB(11) , TALF(11) , CRE(13) .
                              TALF1211,982(11), TALF(31),COR(11),
                              (ALFIYS) RPH(11) , (ALF(80) , TOC(11) ,
                              (AUF(41), 17976), (AUF(42), UNE),
                              (AUF (43) JMS)
COMMUNICATION/AJ.AK.TJ.TK.FA.ATTIO.STR.ATTN.THI.THE.ATTIO
 SATTRE, SHITTE, SHITE,
COPPON/TRANS/ OAMAII.GAMAIS.GAMAIS.GAMAZI,GAMAZI,GAMAZI,
   CAMASE.GAMAS.ESTMAD.ESTMAD.ESTMAD.ESTMAD.ESTMAD.ESAMAD.
  CEPTAD, ESPEND, ESPEND, ESPEND, ESPEND, ESPEND, ESPEND, ESPEND
  CAMES CAMES GAMES CAMES CAMES CAMES CAMES CAMES CAMES CAMES
  . IEDWO. ESCHAD. SSCHAD. I SCHAD. SIGMO. I IGMO. ESCHAD. SEEMA
  GAMDER, GAMESS, GAMELL, GAMELE, GAMELS, GAMESL, GAMESE, GAMESS, GAMESL,
  GAPESE.GAPESS.GAPPIS.GAPES.GAPPES.GAPPES.GAPPES.GAPPES.GAPPES.
 CAPTE, CAPTS
Ecend, Sennd, Iebnd, Esend, Ssend, Isend, Elend, Siend, Siend,
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COMMON/INITAL/ARMILTIMEPP. IPULL. JTESTH, SLOPE
.PROBEA, TLSA.11, IKAI., THESHI, CONST

COMMON/CALCU/FO.FC.F1.TOR1.FS1.FS2.FS3.FCR1.FCR2.FCR3.ETA1.



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etar, etas, patia, patra, patsa, 11,51, 11,52, 11,53, patib, patsa, patiba, VELBI, VELBZ, VELBZ, VELP, FRICP, FRCI, FRCZ, FRCZ, PROBEL

COFFICIAL FOUNT, FSUNY, FSUNZ, TSUNXA, TSUNYA, TSUNZA, TSUNXT,

TSUMT, TSUMET, FSUMTX, FSUMTY, FSUMTZ

CONTINUOUT/FOX,FGY,FGZ,TORX,TORY,TORZ,STRB1,STRB2,STRB3,STRPR COSTON /LOG/YAPMI.YAPME.YAPMI.YLCBI.XLCBZ,XLCBI

FCX, FCY, FCZ

COMPONILATON/ALATON(3,4), CLATON(3,20)

EQUIVALENCE (ADD(B), NF IND) OINENSTON 6(20,6)

. (D(6), SPAN(1)), (D(15), OREOH), (D(15), IPPAL),

(D(18), SKCAB), (D(19), WATT)

. (D(24),EFF), (D(25),QEAR), (D(26),DHOTOR) . (D(23),TREF)

EQUIVALENCE (C. 25), GAMA), (C. 18), RATIO! COPPION/DROQU/ETA, YDC, 2DC

COPION/HARDET/HARDXA,HARDYA,HARDZA,THRIXA,THRIZA COPPOWPULL/RETRAC

COPPIDN /CA/ VCABR(3,10),VCABB(3,10),CABL(3,10),FCAB(3,10), COMPONIEM CON , COME, COM3, CTR (3, 40), CTRT (3, 20)

THOTOR, FCABRILLOS REAL ** HORME

DIMENSION CYCA(3), CABLH(10), SPAN(10), NORMC(3,10). CABL 1 (10) . DELC (10) . RC (3, 10) . TFCAB (3, 10) .

TCABL (10), TCABLO(10), VCABRA(3, 10)

EQUIVALENCE (\$(61), TDRUM) COMMON/RECAL/S(2265)

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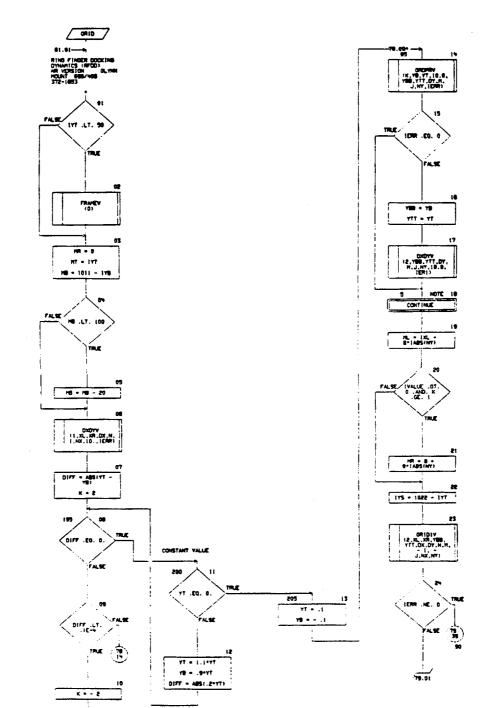
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CHART TETLE - SUBMOUTINE ORIGINAL, INFL. IYE. M., XR. YE.YT





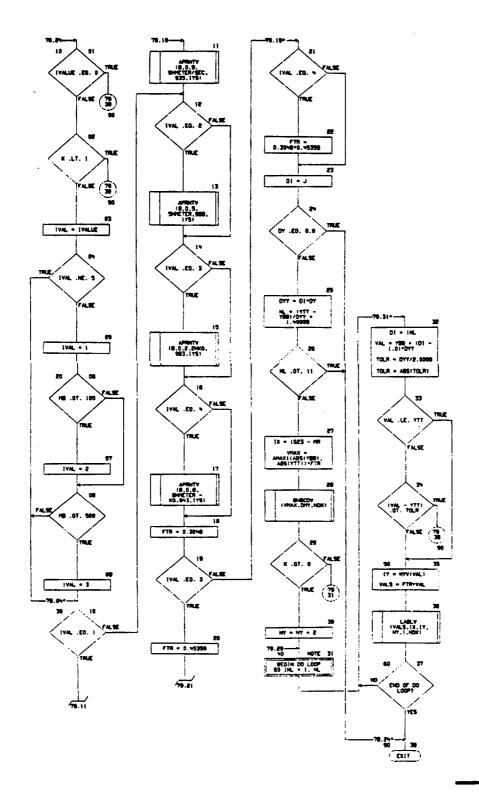
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POLINCET PARTY

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MEAL-6 DHY
COPHON /SHRCRT/IV190)
EQUIVALENCE (IV17), M.J. (IV118), M.D., (IV119), M.D., (IV120), M.T.)
COPHON /COS/ IVALE

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CHART TITLE - NON-PROCEDURAL STATEMENTS

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DINEMBION SCO(1)

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CHART TITLE - HON-PROCEDURAL STATEMENTS

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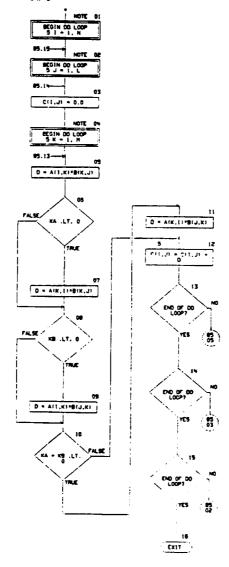
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KOLDOUZ Z



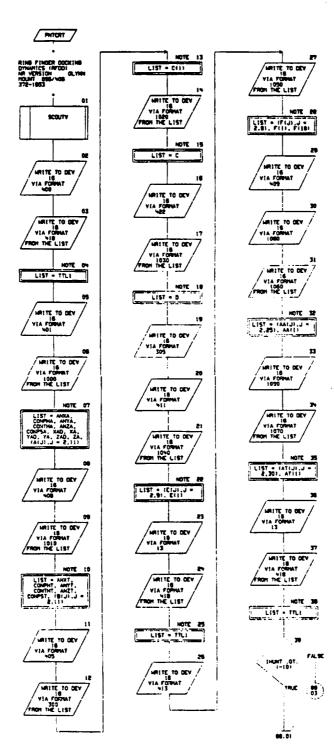
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DIMENSION A(M,M), B(M,L), C(M,L)

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SD 74-CS-0023 POLDOUT PRICES 2

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Rockwell International

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POLDOUTLYNAME: 2

FALSE ISINFL .CO. VIA FORMAT WOOD THE LIST VIA FORMAT LIST -(SSIK),COIK1,K = 1,JNI VIA FORMAT LIST - TFLI ISPLITE TO DEV VIA FORMAT 3001 | NOTE 14 | LIST = | (ACDIL) | = | 1,1301 EXIT



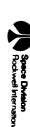
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1030
1040
         7X84.86X146/
1090
        16.8/7X9MADTHTEXE18.8,7X5MADPSTEXE16.8,7X7HDBANKT E16.8,7X7HDBANKT
         E18.8/7XTHEBANET E18.8.7XTHTHCONT E18.8.7XTHPHCONT E18.8.7XTHPSCO
        HT EIB.B/TXTHREACTT EIG.B.TXTHBANXT EIB.B.TXTHBANYT EIB.B.TXTHBA
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CHIEF TITLE - HON-PROCESURAL STATEMENTS

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DIMENSION VAR(2480), T(2285), A(15), B(15), C(50), D(30), E(15), F(10),
                    AA(25) .AT(30) .CO(10) .95(10)
          COLIVALDICE (T(1), EA), (T(2), YA), (T(2), ZA),
                      (DEIN), IMINT), (CINT), ISHPL),
                     (T(85), (GAY, (88), (T(87), 2A0),
                      (E19),JR(), (C(19),THORO),(C(20),JR((99))
         EQUIVALENCE (VARCE), ACE)1, CVARCES, SCED , CVARCED , CCED 1,
                      (VAR(81), 0011), (VAR(111), 0111), (VAR(180), F(11)),
                     (VARCISE), AACI3), (VARCISI), ATC11), (VARCISI), COCC2),
                     (115, (115) NAVI, ((138, (105) NAVI
         COPPON/ACCHEDI/ACC(100)
         REAL+8 TTL1.TTLE
         COPPON /TITLES/ TTL1(8),TTL2(6)
         COPPON /DUPPTY/ MRKA, MITA, ANZA, COMPHA, CONTHA, COMPSA,
                      MRT, MYT, MET, COMMIT, CONTHT, COMPST
13
         FORMT(INT)
37
         FORMATITITISTES STROKE VS AREA TABLES TITLE
98
         FORMT 1979E19.8.5X.E15.81
         FORMATISSE ... NO ATTENUATORS *1.13.// 1
         FORMATCIN .//?
310
         FORMATISON, ***** ADD - ARRAY **** 1,7/1
        FORMATIONS .... 1
401
         FORMATISEX.194 ACTIVE VEHICLE//1
403
        FORMATISON," C-ARRAY/ ATTENUATOR DATA 1// >
        FORMATISOX, ISH TARGET VEHICLE!!!
        FORMATIVEN, 2NH REACTION CONTROL SYSTEM//
        FORMATISON, LTM PROGRAM COMMANDS//1
413
        FORMATISEX. 17H INTEGRATION DATA//3
410
        FORMATISEX.INI CASE NO.5A8//1
        FORMATCIN .//,50%." D ~ ARRAY *// 5
        FORMATITATHOMEGNA EIS.S.7X349MANNEIS.S.7X84DFEGYALKEIS.S.7X34TMANK
        E18.8/7XB-GPEGZATHE18.8,7XD-FEA-HZ18.8,7XD-GXAD-HZE18.8,7XB-GXADHZE18.
        8/7X3HYADNXE18.8.7XZHYASXE16.8.7X3HQADNXE18.8.7XZHQASXE18.8/7X3HDH
         ANKEIS.S. TXWOCKIAZKEIS.S. TXWKYYIAZKEIS.S. TXWCZZIAZKEIS.S/TXWCYIAZ
         KE18.8.7XWKZIADKE18.8.7XWKZIADKE18.8.7XDKGFFJAZKE18.8/7XDKGFFKAR
         XE18.8,7KBHRASKE18.8///1
        FORMATITABHONCONTINEIS.S.TXSHPHTNIEIS.S,TXBHONCOYTINEIS.S,TXSHTHIPA
        NEIS.B/THE-REPECTINEIS.B.TKE-PST-HEIS.B.TKE-ONT-HEIS.B.TKH-HOK!TENE
        18.8/THWHYITEEIS.8.7XWZZITEEIS.8.THWKYITEEIS.S. THRKZIT C
        16.6/7KWYZITZKE16.8,7KS-OFF JTZKE18.8,7KS-OFFKTZKE16.8,7KS-OFFSKE16
        FORMATTIN (BEIS. 6)
        POPMATION .8E15.81
        FORMATION, THIPMASE IIS. THINGSTOPSHEIS. 8. THINGSLIPP EIS. 8. THINGSESS
       E18.8/ TXTHIGRAPH 218.7XWGELPSHEIB.8,7XTHGESLC EIB.8.
        7X949L0TEX118///1
       FORMATITATHMESH EIS.S. TRINGERIIS, TREMASSICIS.S. TREMASSICIS.S.
         7X3HKA14X118.7X2HA25XE18.8.7X2HA45KE18.8.7X2HA75XE18.8/
        7X$HAZAHXE18.8,7X$HAHAHXE16.8///)
       FORMAT (7X7HTHCOMA E18.8,7X7HPHCOMA E18.8,7X7HPSCOMA E18.8,7XHHMRXA
       \textbf{3} \textbf{XE16.8/7} \textbf{XMMARYASKE16.8,7} \textbf{XMMARZASKE16.0,7} \textbf{XMMADPMAZKE16.0,7} \textbf{XMMADTMA} \\
       EXELS.8/ TXTHADPSAZNEIS.8.TXTHODANNEIS.8.TXTHORANNE
        16.8/7X7HOBANKA E16.8,7X7HOBANYA E16.8,7X7HOBANZA E16.8,7X3HTHANKE
       IS.S/TXTMREACTA E18.8,TXSMBANKAENE16.8,TXSMBANKAENE16.8,TXSMBANEAR
       XEAKAPPERT, B. BIBKSAKHHERT, B. BIBKSAKAPPERT, BIIKRIHSKT-B. BIE BERTHAKAP
       E16.8/7X7HREACTIAE16.8///)
       FORMATITXSHRADTYERE16.8,7KWHOTZSKE16.8,7KSHFTRETEXE16.8.7KSHBRTHK
       E16.8/7XWARKTSKE16.8.7XWARYTSKE16.8,7KWARZTSKE18.8,7KSMAPHTZKE
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CHART TITLE - NON-PROCEDURAL STATEMENTS

HET EIB.B/7X3-DOINNEIB.B,7X3-DOZNEIB.B,7X3-DOZNEIB.B,7X3-THINXE 18.8/7XSHPWXT2XE16.8,7XSHMXT2XE16.8,7XSHPWXT2XE16.8,7X4HIRC53X

116/ TXWHIVENEXIIS

.7X749EACT1TE18.8///)

FORMATHSK, 24H ACTIVE CONTROL SYSTEM //

FORMTIVSK, 24H TAROET CONTROL SYSTEM / /)

FORMAT (1HD, 8E15.8)

960 1000

FORMTILL, NEX. 31M SHPLIFIED INITIAL CONDITIONS //, TXSHTWMOEMELS .8,7X3HTHTOTEXE16.8,7X3HTHNELEXE16.8,7X7HNELLAT E16.8/

TASIONEGRENEIS. B. TASHONEDIENEIS. B. TATHTHONED EIS. B. TATHVAXIAL E18.8/7X740H1SS E18.8,7X7HTHCR0 E18.8//)

TORNATIVI, WEX, SIN STABILITY PARAMETERS OF MANT 11, TXTMINANT 116. TXSHOELTARKE 16.8, TXSHOELTLEVE 16.8, TXSHALINEYE 16.8/

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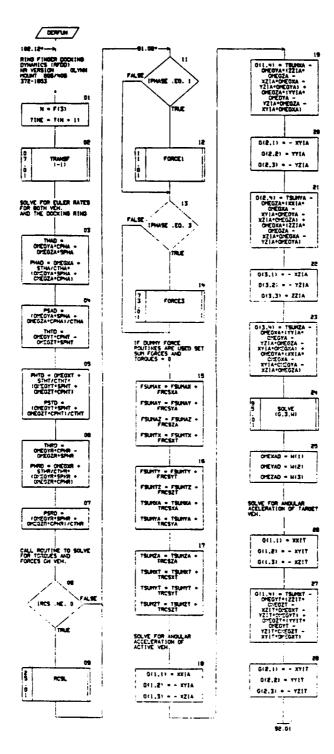
TXSHM.HAXZXE! 6.8, TXSHVAHINZXE16.8//)

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CHART TITLE - SUBSCUTTINE DERFUN

L Breef Enormone

O18,41 = TSURYT
OMEGST*(DS)T*
OMEGST*(DS)T*
X717*OMEGST*) =
MEGST*(ZS)T*
OMEGST*(ZS)T*
OMEGST*
XZ17*OMEGST*
YZ17*OMEGST*) 0(3.1) 4 - 1217 013.21 - - YZIT 0(3.3) • 2217 0(3,4) - TSURCT OMEGAT-17917-CYESYT -YEIT-CHEGAT -XYIT-CHEGAT -CHEGAT -CHEGAT -XYIT-CHEGAT -XZIT-CHEGAT -XZIT-CHEGAT -90LV€ (0.3,H) OMEXITO - MILL DHEYTO - MIZT OHEZTO - M131 SOLVE FOR ANGULAR ACCELERATION OF DOCKING RING 2R00 = (FRX*GR(3 + FRX*GR331/XMR O-EXRO = (TRX -OFEOZR-CHEGYRO (ZZIR -YYIR) I/XXIR DKAD - KAD CHEYRO = ITRY -CHEGIR+CHEGIR+ (XXIR -ZZIR))/YYIR DAY - CAYO 02A0 - ZAD 01X - 01XC OPEZRO = (TRZ = OPEGYR+GREGUR+ (YYIR = XXIRI)/ZZIR DYTO - YTO 0210 - 210 DXRD = XRD SOLVE FOR LINEAR INERAL ACCELERATION OF BOTH VENICLES AND THE DOCKING RING D2750 • 275D NOTE 14 SEGIN DO LOOP T(1 + 1 + N) = TIPED - TIPE EXIT

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Space Division Rockwell International

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DIMENSION YAR(2489),T(2285),A(15),B(15),C(50),O(30),E(15),F(10),
          481181, 101100, (CELTA, (CS)AA
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.0(25,6),M(20)

\$(2205)

COUPALDICE (TC1), (AX, (E)T), (AY, (E)T), (AX, (E)T), (E)T (ASOBAD, (E11), (ANORMO, (B11), (ANORMO, (T11), (T2, (B)1) (TILE), CHECKET), (TES1), CHECKET), (TILE), CHECKES, CTCEST, THAT, CTCENT, PHAT, CTCEST, PSAT, CTCEST, THTT), ETELTS, (PHT) , (TELS) , (PST) , (TELS) , (TEZO) , (P) , (11211,29),(11221,30),(1(23),(0),(1(29),20), (T125), (AD), (T(26), (AD), (T127), (DA), (T(28), KTD), (1(291,101,(1(30),210)

EQUIVALENCE(TIS), (RR., (PE)T), (DRS, (EE)T), (DRS, (EE)T), (DRS, (EE)T), (RR., (PE)T), (RR., (PE)T) YRI, (1736), 2RI, (1737), (194), (1738), (188), (1738), (194), (1740), OPEOURI, (T(4)), OPEOYR), (T(42), OPEOZR)

INTEGER F

, (OTXO, (F) NO), (DASO, (E) NO), (DAYO, (S) NO), (DAXO, (1) NO) SONGLAY LUCE (DK15), DYTD), (DK16), DZTD), (DX17), OFEXAD), (DX18), OFEYAD 1,100(9),0HEZAD),(0X(10),0HEXTO),(0X(11),0HEYTO), (OXCI2), OFETO), (OXCI3), THAD), (OXCI4), PHAD), (DX115) ,PSAD) , (DX116) , THTD) , (DX117) ,PMTD) , (DX118) ,PSTD 1, (DX(19), (OX(20), (DX)21), (OX(21), ZPO) , (DX(24), ZDD1, (DX(25), XADD1, (DX(25), YADD1, 10X1271, 2001, 10X1201, 1001X1, 10X1201, 10X1301, 10X1301

EQUIVALENCE(0X(31), XROO), (0X(32), YROO), (0X(33), ZROO), (0X(34), 0XRO) (OSCI 35) (OYRD) (OXCI 35) (OZRD) (CXCI 37) (TRQ) (CXCI 38) (PSRD) (DRY39), PHRQ1, (DRY39), (BRY30), (DRY41, OFFYRD), . (CH152HO, (SP130))

(RIZZ, (7)00A), (RIYY, (8)00A), (RIXK, (8)00A), (RRIX, (4)00A),

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EQUIVALENCE (A12), (AMA), (A13), XXIA), (A14), (Y)A1, (A15), XXIA), IAIST, XYIAT, IAITE, XZIAT, IAISE, YZIAT, IAISE, OFF, AL TAT101, OFFKAT, TATE1), RAT

EQUIVALENCE (8(2), (7(8), (8(3), XXIT), (8(4), YY)T), (8(5), XXIT), (2(5),XYIT),(8(7),XZIT),(8(8),YZIT),(8(9),OFFUT), (8110), OFFXT), (8111),RT)

EQUIVALENCE (EIR), (PHASE), (EIR), STOP), (EIN), (PLOT), (EIR), (TABLE), (E18), 10RAPH1, (E17), 0ELP1, (E18), 0ESLC1, (E19), JH1, IE1107.ICASE

, (SC191,FRCSKA), (SC20),FRCSYA),(SC31),FRCSKA),(SC21),FRCSKT), (\$(23),FRCSYT),(\$(26),FRCSZT),(\$(25),TRCSXA),(\$(26),TRCSYA), (\$(27), TRCSZA), (\$(28), TRCSXT), (\$(29), TRCSYT), (\$(30), TRCSZT)

EQUIVALENCE (VARCE), ACED , (VARCES), EVEN , (VARCES), CCEP), (VARIES), 00131, 14AR1111, 0133, 14AR1128, 16133, CELICO, CIRLIPARI, CELITA, CELITA, CELITA, CELITA, CARCINIO, (41)T, (11\$)RAVI, (11182, (10\$)RAVI . (AT (29) , (RCS)

COMMON YAR

COMMON TRANS SAMAIL GAMAIL GAMAIR, GAMAIL GAMAR . [ETMAD, ESTMAD, SSTMAD, 1STMAD, SITMAD, 11TMAD, EEAMAD, SEAMAD GANT32.GANT33.GANT11.GANT12.GANT23.GANT21.GANT23.GANT23.GANT31. CAMPER, GANTIES, GAMETE, GAMETE, GAMETE, GAMERE, GAMER . IECHAD, ESCHAD, SSCHAD, ISCHAD, SICHAD, IICHAD, EESHAD, SESHAD GAPORE, GENAD, ESCHAD, ESCHAD, ELCHAD, ELCHAD, ELCHAD, EECHAD, SECHAD, GAPCSZ,GAPCSS,GAPP11,GAPP12,GAPP13,GAPP21,GAPP22,GAPP31, GAMPSE.GAMPSS

EEZNAD, SEENAD, 1 EZNAD, ESZNAD, 159NAD, E1ZNAD, SIZNAD, SIZNAD, CCHPON/RECAL/S

COPHON/INITAL/ARMI, TIMEPP, IPULL, JTEST4, SLOPE

PROSEA, TLSA, LL, IKAL, THESHI, CONST

CONTON/FORC/FSUNAX, FSUNAY, FSUNAZ, TSUNDA, TSUNYA, TSUNZA, TSUNDIT, TSUNT, TSUNZT, FSUNTX, FSUNTY, FSUNTZ

COPPON/ANGLE/STHA, CTHA, SPHA, CPHA, SPSA, CPSA,

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STAT, CTHT, STAT, CTHT, STST, CPST COPPON / AMOLER/STAR, CTHR, SPRR, CTHR, SPSR, CTHR

COMMONFORCR/FRX,FRY,FRZ,TRX,TRY,TRZ COMMONTRAME/CRII,GRZI,GR31,GRIZ,GRZZ,GR3Z,GR33,GR33

COLFICH/ADDNEW/ADD(100)

CORNON/DROGU/ETA, YDC, 2DC CORRON/HARDFT/HARDXA, HARDXA, HARDZA, THROXA, THROXA, THROZA

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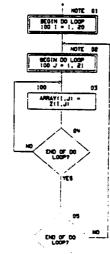
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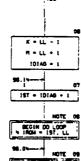
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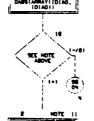
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SOLVE

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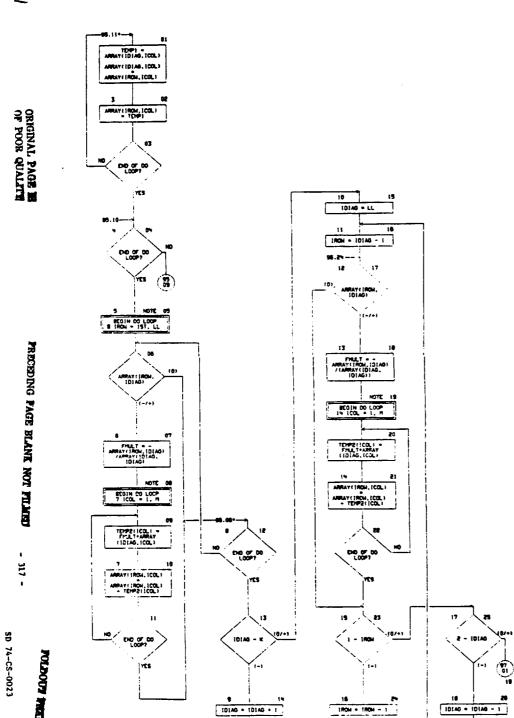
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TITLE - SUBMOUTINE SOLVE(Z.LL.X)



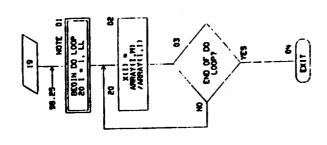
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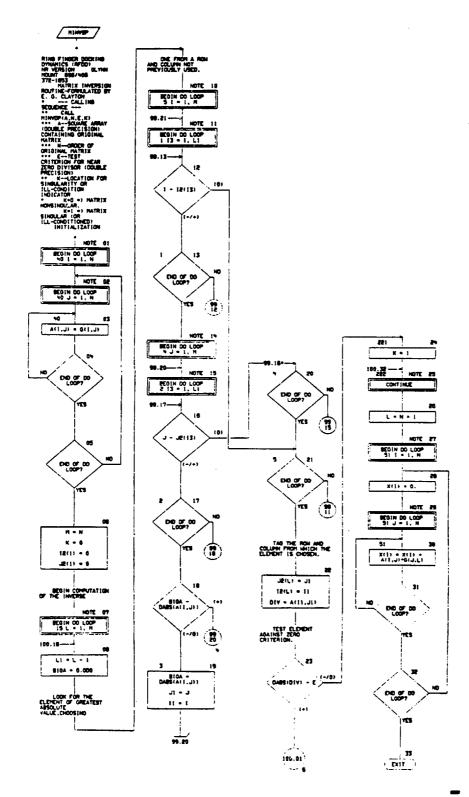
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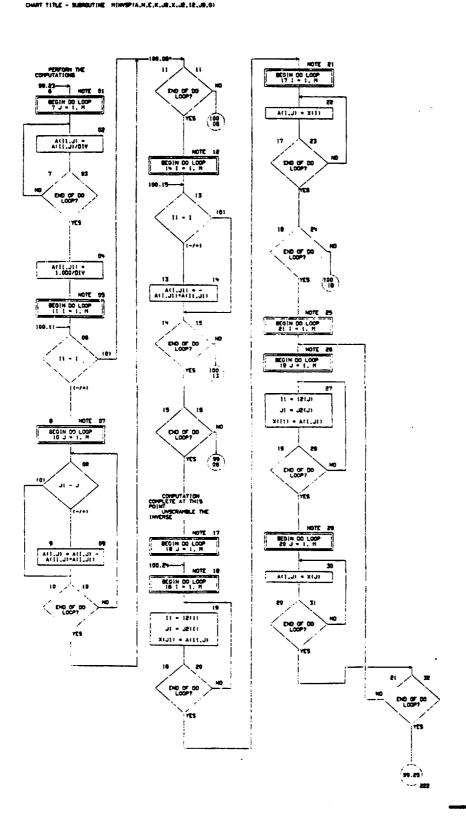


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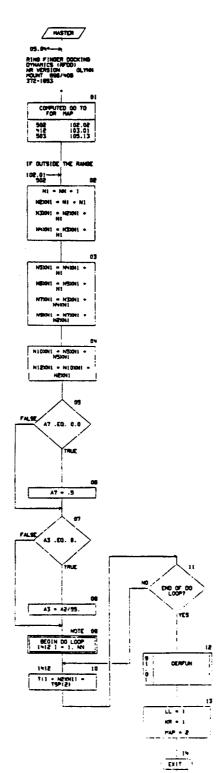
- 325 -

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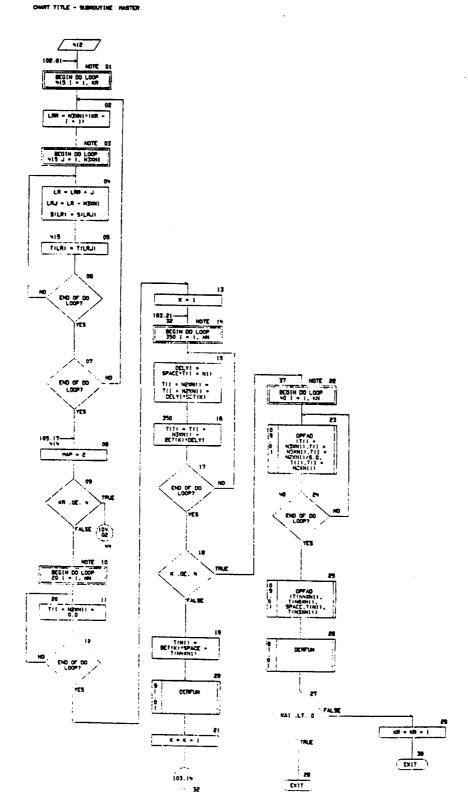
- 327 -







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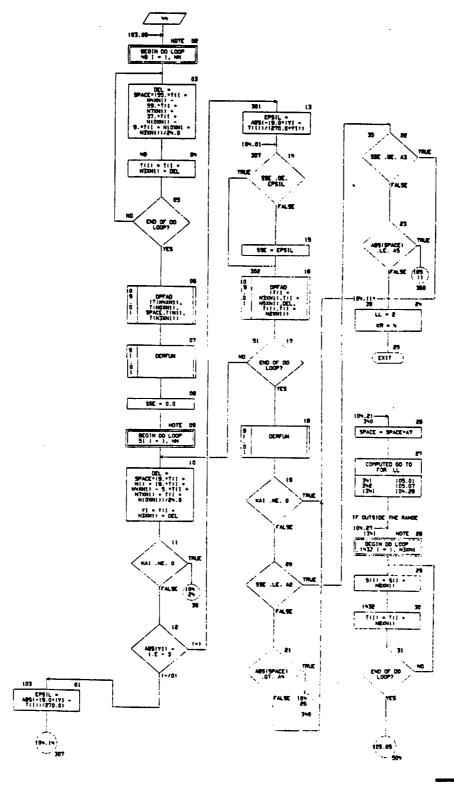
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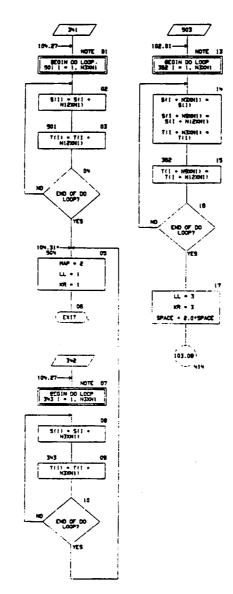


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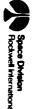
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US/22/74

CHART TITLE - NON-PROCEDURAL STATEMENTS

DINENSION YAR(2480), T(2265), S(2265), F(10)

DIMENSION BETTA, SETTA

DIMENSION TSPIRE

DOUBLE PRECISION TOP

EQUIVALENCE (TSP(1), TDP)

EQUIVALENCE (F(2), SPACE), (F(3), NN), (F(4), A3), (F(5), A5), (F(6), KA1),

EQUIVALENCE(VAR(211), T(11), (VAR(126), F(11)) (F(7), A2), (F(8), A4), (F(9), A7)

COMMON/RECAL/S COPPION VAR

COMPON/PP/HAP, LL

COPPON/PP1/KR.K

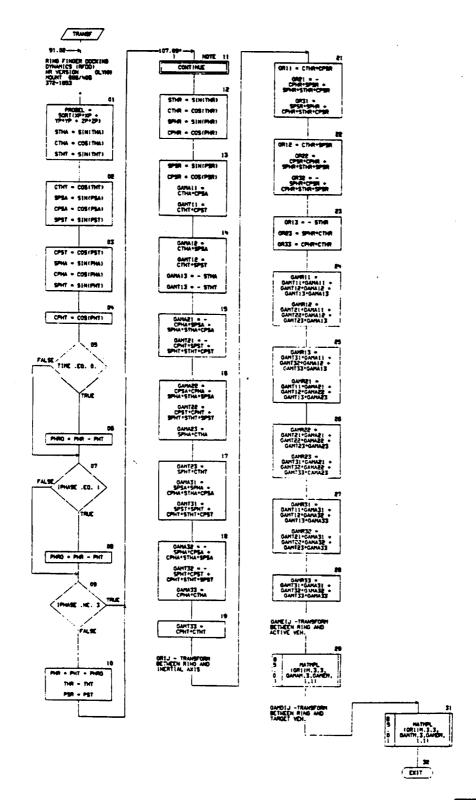
DATA SETTI11/1.0/,SETTE1/2.0/,SETT31/2.0/,SETT41/1.0/ DATA BETT111/0.5/,BETTE1/0.5/,BETT31/1.0/,BETT41/0.0/ DATA TOP/0.DO/

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- 335 -

CHART TITLE - SUBMOUTINE TRANSFILTMAN



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DIFENSION ORIGIN(3.3), CANAMICS, 3), CANERIS, 3), CANERIS, 3), CANTRICS, 3), CONTRICS, 3), CONTRICS, 3), CONTRICS, 3), CONTRICS, 3), CANTRICS, 3), CANTRICS,

DIMENSION VAR(2469),T(2265),A(15),B(15),C(50),D(30),E(15),F(10),

AA(25),AT(30),CO(10),SS(10) EQUIVALENCE (T(1),XA),(T(2),YA),(T(3),ZA),(T(4),XT),(T(5),YT),

(T(8), 27), (T(7), OFEGYA), (T(8), OPEGYA), (T(8), OPEGZA), (T(10), OPEGXT), (T(11), OPEGYT), (T(12), OPEGZT), (T(13), THA), (T(14), PMA), (T(15), PSA), (T(16), TMT), (T(17), PMT), (T(18), PST), (T(18), XP), (T(18), VP),

(T(E1), ZP), (T(E2), XD), (T(E3), YD), (T(E4), ZD), (T(E5), XAD), (T(E8), YAD), (T(E7), ZAD), (T(E8), XTD), (T(E9), YTD), (T(E3), ZTD)

EQUIVALENCE(T(31),XND),(T(32),YND),(T(33),ZND),(T(34),XN),(T(35), YN),(T(36),ZN),(T(37),YNC),(T(38),PSN),(T(39),PNR),(T(40), OPEXXN),(T(4)),OPEXXN),(T(42),QPEXZN)

.(E(2), IPMSE)

EQUIVALENCE (VAR(1), A(1)), (VAR(16), B(1)), (VAR(3)), C(1)),

(VAR(8)), D(1)), (VAR(11), E(1)), (VAR(126), F(1)),

(VAR(136), AA(1)), (VAR(16)), (VAR(19)), CO(1)),

(VAR(20), SS(1)), (VAR(21)), (VAR(19))

COPPIDA VAR

COPPON/EFLEX/TIME, DX (190), ADDS (1900)
COPPON/TRANS/ GAMA!! GAMA!E, GAMAE!, GAMAE, GAMAES, GAMAS!, GAMAES, GAMAS!, GAMASE, GAMAS, GAMASE, GAMAS, GAMASE, GAMTES, GAM

OAPDR.CAPPIS. .GAPSII.OAPSIE.GAPSII.OAPSII.OAPSII.OAPSE.CAPSZI.OAPSII.OAPSIE.CAPSII. COPPON/ANQLE/STVA.CTVA.SPVA.CPVA.SPSA.CPSA.

STMT.CTMT.SPMT.CPMT.SPST.CPST COPMON / ANGLER/STMR.CTMR.SPMR.CPMS.SPSR.CPSR COPMON/TRANSF/CRIT.GR21.GR31.GR12.GR22.GR32.GR33 COPMON/INITAL/ARRIT.TIMEPP.IPJ.CL.JTESTW.SLOPE

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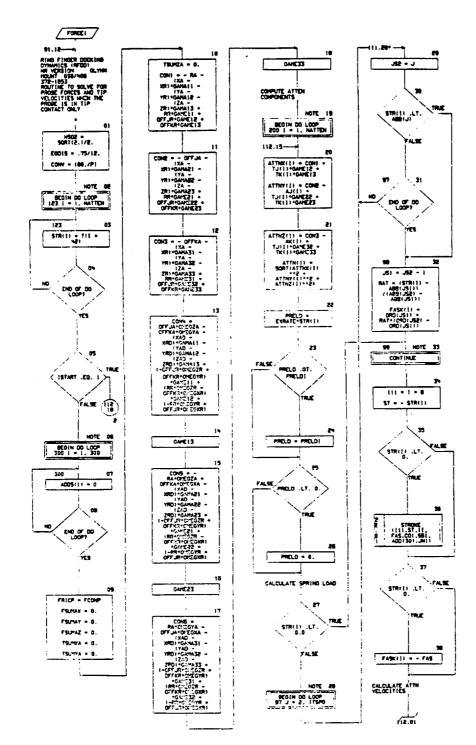
DOUBLE PRECISION AL.BI.CI DIMENSION A(6) EQUIVALENCE (A(1).AI).(A(3).BI1.(A(5).CI) DATA A(1).O.O/

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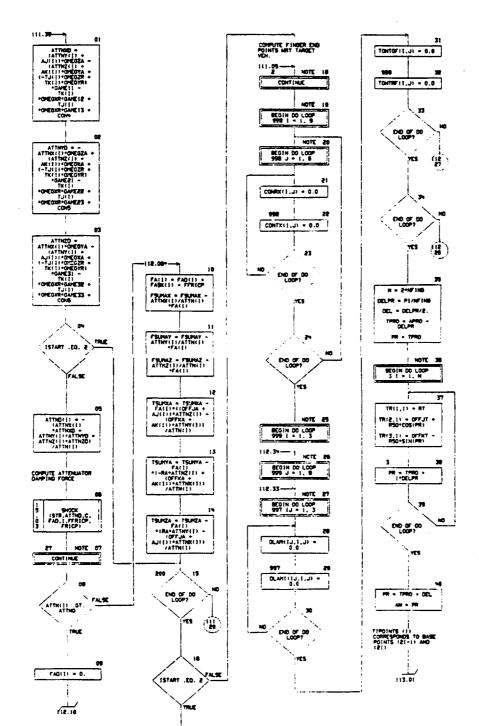
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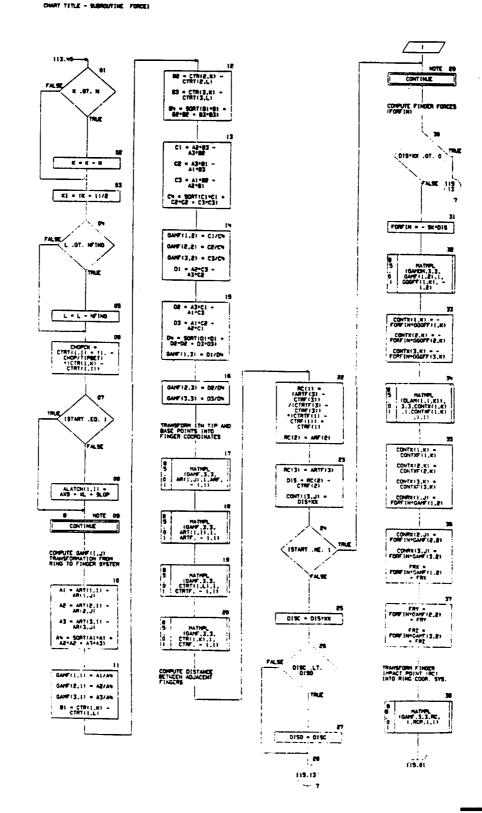
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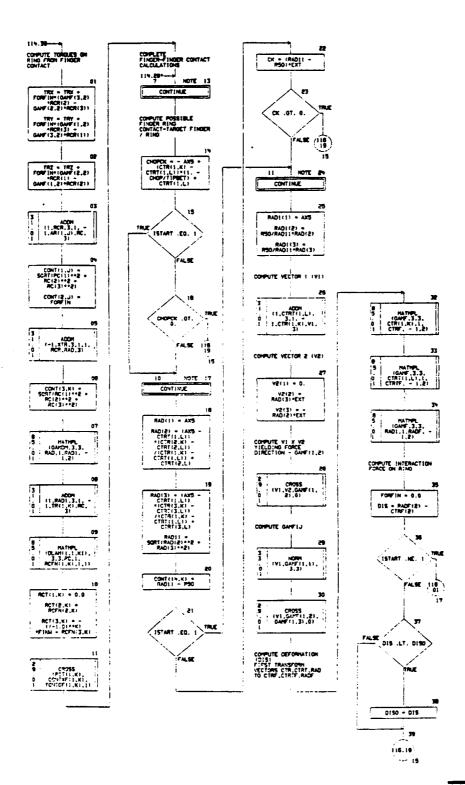
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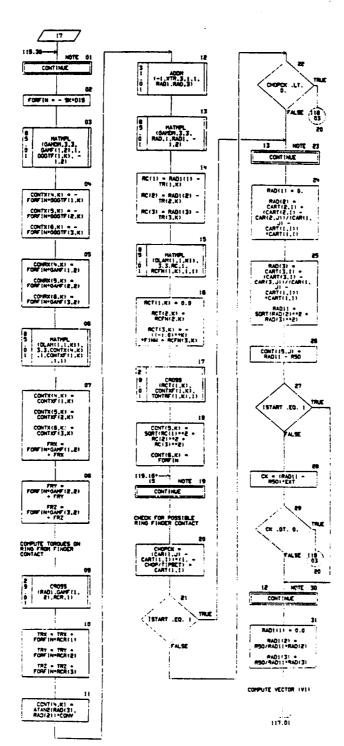
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ADDH (1.CAN(1.J).3. 1.CART 1.1). VE(1) - 0. VE(E) ... V2(3) - -C COMPUTE (VI)X(V2) YICLDING FORCE DIRECTION GAPT(1,2) CONTX17.J) = FORF IN-000TR(1.J) CONTX(8,J) = FORF (N+000TR(2,J) CONTX:9,J) = FORFIN-GOOTR:3,J) CONTX(7,J) = -FORF (N'GAFF(1,2) CONTX18.J1 . -COMM(19,J) + + FORF[N*GAPF(3,2) FRX = FRX -FORF IN-GARG(1,2) FRY . FRY ... FORF (N°GAMG(2.2) FRZ + FRZ -FORFIN*GAMG(3,2) MATHPL (GAMF.3,3, CAR(1,J1,1, CARF, ~ 1.2 TRANSFORM SYSTEM 3 DIS - RADF(2) -CARTF(2) TRX = TRX -FORFIN*RCRC(1) TRY - TRY -TRZ = TRZ -2150 - 015

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CHART TITLE - SUBROUTINE FORCES

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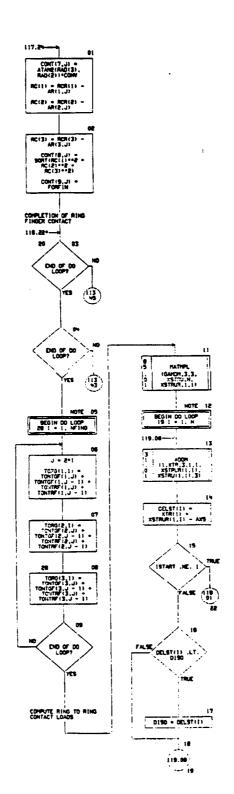
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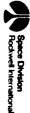
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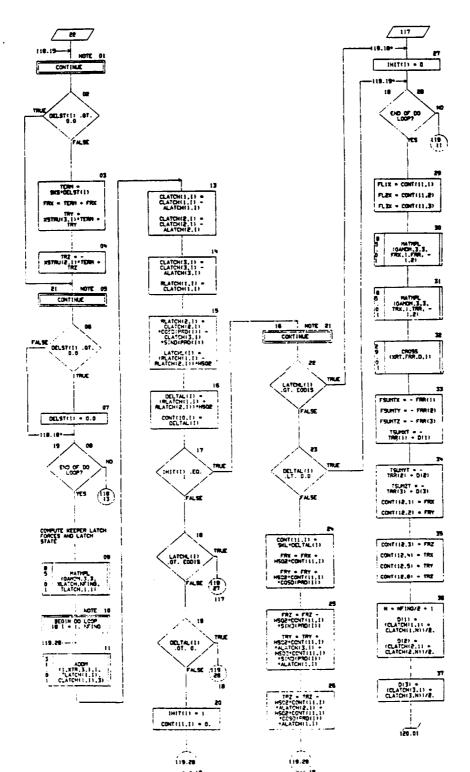
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FRY + FRY + FRR(2) FRZ = FRZ -FRR(3) TRX = TRX -TRR(1) -(XAR(2) + FRR(3) -XAR(3) + FRR(2) TRY = TRY -TRR(2) -(XAR(3) + FRR(1) -XAR(1) + FRR(3) 9551M 00 LOCP 120 1 = 1, MATTEN 120 11 EXIT



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".OH CHART SET - RFDD.FLO RFDD-FLOH
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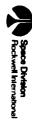
CHART TITLE - HON-PROCEDURAL STATEMENTS

95/22/79

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REAL+D TYPE
 DIMENSION TYPE (2)
  DATA TYPE! PRELATON , 'N/LATON '/
  OMEDISTON VAR(2400), T12205), AC151, BC151, C1901, D(30), EC151, F(10),
                                  AA(25),AT(30),CO(10),$$((0)
DINENSION ATTROCEDI, ATTRYCEDI, ATTRACCEDI, ATTRICEDI, STRICEDI, PASICEDI
  (05) INT. (05) NT. (05) LT. (05) NA. (05) NA. (05) ORTA, (05) ORTA,
    (05.E)(CTAJT, (05.E)(CTAJK, (E) QAR, (E)(SV, (E) LV, (95.99)
     (E) (DAR, (DS) TIMI, (DS. E) MOTALD.
DIMENSION MIT(3), TAR(3,40), TART(3,80), MRTY(3), RYT(3), CAR(3,46),
   (E) 2020, (E) RVTRX, (E, E) 2010, (E) TRAD, (E) TRAD, (E) 2020, (E
 COA. (EZ) COA., (SC) COA., (CO), (CO
 NE, (ADD(94), AE, (ADD(95), HCO)
  .(ADD(711,36.).(ADD(721,RAGL)
 CONTINUENT ALATON (F. E) CLATCH
 EQUIVALENCE ($195) . (NIT(1)) . (ADD(29) .90.)
DIMENSION ADDITION . COLUMN . $51(18)
 EQUIVALENCE (ADD(70) . JN(1) . (ADD(81) .COL(11) . (ADD(91) .SEL(11)
 DIRENSION ORI IN(3,3), GARTRICS, 3), GARCH(3,3), GARCH(3,3), CTR(3,40),
                                       TRIS,401,187(3,201,CTRT(3,201,AFF(3),ARTF(3),CTRF(3).
                                      CERTF(3), SUMA(3), TSUMA(3), PRR(3), TRR(3), XXXC(3), XXC(3),
                                       (E) 2R, (E, E) 3HAB, (E) R2R, (E) RXTX, (E) RTX
 EQUIVALENCE (GRISH(),1),GRISS,(GAMTH(),1),GAMTISS,(GAMCH(),1),
      (1139A0, (1,1)(39A0), (1109A0
   TRITTO, (E) 00A1, (RLTTO, (S100A), (AR), (1) 00A130HQ1(AVIU)
                                    19122, 17100A), 1917Y, (2100A), 1913K, (2100A), 197K, (4100A),
                                      T38. (#1100A), (#25A, (#1100A), (APRO), (#100A), (#100 (H3), #25)
                                  1,(A00(15),TIPSET),(A00(16),TPR0),(A00(17),CH0P)
                                        . (ACOTIBLISK), (SUPATI), FSURAX), (TSUPATI), TSURA)
                                       (EYA. ($1100A), (EXA. (11103A), (069, (81103A),
                                       (TRATE), (05)00A), (0210, (01)02A),
    EDULYALENCE (T(1), XA), (T(2), YA), (T(3), ZA), (T(4), XT), (T(5), YT),
                                            (T(B).ZT).(T(7).OHEGKA).(T(B).OHEGYA).(T(9).OHEGZA).
                                            (T(10) OHEGXT) (T(11) OHEGYT) (T(12) OHEGZT) .
                                            (T113) . DIA) . (T(15) .PHA) . (T(15) .PSA) . (T(16) .THT) .
                                            (T117), PAT1, (T118), PST), (T(19), XP), (T(20), YP),
                                             (1(21),29),(1(22),30),(1(23),40),(1(29),20),
                                            (T(25), XAD), (T(26), YAD), (T(27), ZAD), (T(28), XTO).
                                            (T(29),YT0),(T(30),270)
    EQUIVALENCE (T (31) JURG) , (T (32) JURG) , (T (33) JURG) , (T (34) JURG) , (T (35) J
                            YRL, (1:361,281,(1:371,1HR),(1:381,PSR),(1:391,PHR),(1:40),
                  CREDENC, (T(4)), (PROPRI), (T(42), OPECIZA)
                                          . (DX(19), XPO), (DX(89), YPO), (DX(81), 2PO), (DX(84), 2DO)
      COULVALENCE (A19).OFFJA),
                                            (ALID), CEFKA), (ALIL), RAI
      EQUIVALENCE(C(25), GANA), (C(18), RATIO)
      EQUIVALENCE (819).OFFUT).
                                             (8110) OFFKT) (8111) RT1
      CAMPLA, (413), (TO, (E13), (AG, (S13), (MSTTAN, (113), SSMSJAV1003
      . (C18), THEN . (C19) . PRELOTI . (C10) . DELPRE . (C11) . BRATE
      (CCL2), (CCL3), (CCL3), (CCL4), (CCL4), (CCL5), (CCA, (CCL3), (CCL4), (CCL3), (CCL4), (CCC4), (CCL4), (CCC4), 
                                          107191, 1513, (CC813, 001, (CC8213, 401, (CC831, 8721, (CC831, A01
        . (C(5),EXT),($,0P,C(6))
      COPPIDM/STRY/TRT
      REAL ** LATCH
      COPPON /FOLLY/LATCHL/31 ,PRD(31
      EQUIVALENCE (E(5), ITABLE), (E(9), JN)
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EQUIVALENCE:STOP.E(31) DIMENSION CONTINUES, 201 EQUIVALENCE (ACOS(1) .CONT(1,1))

EQUIVALENCE (\$135) , MODE) , (\$(36) , K) , (\$(37) , VEL)



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AUTO-ON CHART SET - REDO.PLO RETO-PLON

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OWRT TITLE - HON-PROCEDURAL STATEMENTS

05/82/79

COUPALDICE (VARCE), (CO), (BINAVI), (CO), (E) SARCE), (CO)), (VAR(81),8(1)), (VAR(111),E(1)), (VAR(128),F(1)), : ((1)(0), (((1)14, ((31)14, ((31)14, ((31)14, (32)1)1))) (6197, (615) RAV), (61986, (105) RAV) COMON/EPLEX/TIPE.OX(158) ,A005(1880) COPPLON VAR COMPONENCON , COMP, CONS. CTR. CTRT COPPICIN/OUTH/XXXIFI, RYT, KTIRR COPPON/ATTACH/AJ, AK, TJ, TK, FA, ATTHO, STR, ATTH, THI, THE, ATTHO SHITA, YMTTA, MITTA, CONTON/TRANS/ GAMAII.GAMAIZ.GAMAIZ.GAMAZI.GAMAZZ.GAMAZZ.GAMAZZ. . IETHAD. ESTHAD. SSTHAD. ESTHAD. ESTHAD. ISTHAD. ISTHAD. SEAHAD. SEAHAD. CANTER GANTES GARREL CANTER CANTER CANTER CANTER CANTER CANTER CANTER CAMPSE. CAMPSS. CAMPS 1. CAMPS 2. SAMPS 1. CAMPS 2. CAMPS 1. , ICOMO, ESDNO, SSDNO, ISCMO, EIOMO, SIONO, IIOMO, EESNO. SEEND OAPOSE.GAPCSS.GAPC11.GAPC12.GAPC13.GAPC21.GAPC28.GAPC23.GAPC31. , IETHO, ESPAD, SSPHO, ISPHO, EIPHO, EIPHO, EIPHO, EZHAD. CAPSE.OMPSE ECONO, SEOND, ICOND, ESOND, ESOND, ISOND, EJOND, EJ COPPONENTAL/ARRESTHERP, IPULL, JTESTH, SLOPE .PROBEA.TLSA. II, IKAI.THESHI, CONST COMMINICALOUFO.FC.F1.TORL.FS1.FSE.FSS.FCR1.FCR2.FCR3.ETA1. ETAR.ETAS.FRTIA.FRTSA.FRTSA.TLS1.TLS2.TLS3.FRT18.FRT28.FRT38. VELBI. VELBE. VELBE, VELP, FRICP, FRC1, FRC2, FRC5, PROBEL COTTON/FORC/FSUNAX,FSUNAY,FSUNAZ,TSUNAA,TSUNYA,TSUNZA,TSUNKT, TSURYT.TSURZT,FBURTX.FBURTY,FBURTZ COPPON/ADDNEDA/ADD CORPON /ADDLE/ ALF (50) 011900, 011920, 011000, (0198A HOTBICHIO COULYALDICE (ALF(01), ABB(13), (ALF(11), ORD(13), (ALFIELL, \$52(1)), (ALF(\$1), COR(1)), TALFINED, ITSPOT, TALFINED, JARD COPPONEFORCE/FRX,FRY,FRZ,TRX,TRY,TRZ COPPON/TRANS/ORL1.0R21.0R31.0R12.0R22.0R32,6R13.8R25,6R33 COPPORT PECAL/STERMS COMMUNIFINIAR(3,40),ART(3,80) COPPOR /FRCE/ CONTX:9.6),CONFOCE,6),IFRCE ,0ELST(18) DIFFERENCE RLATCH(2,3), DELTAL(3) DIRENSION XSTRUIS. 101 ,XSTRUR(3, 10) EQUIVALENCE (905.0191) DIPENSION 000FF(3,6),000TF(3,6),000TR(3,6) DIPONSION GLARITA.3.81.GLARIEIS.3.81,CONTRETS.81,RCPRES.81.

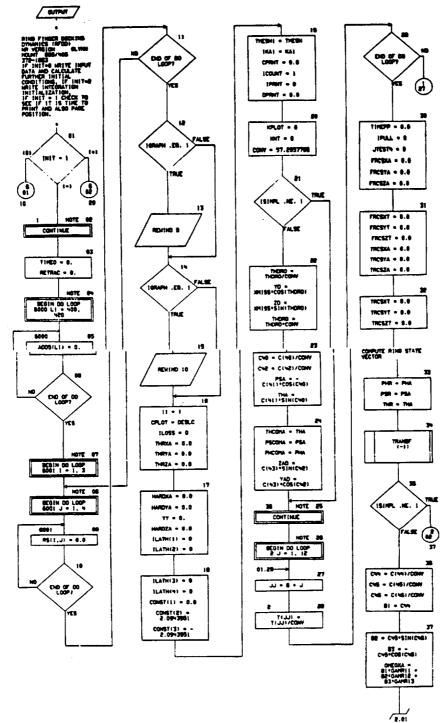
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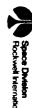
COPPION /PRO/ TORG(3.8) DATA PEZZVESENSETZ



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TITLE - SUBMOUTINE GUITPUT(INIT)





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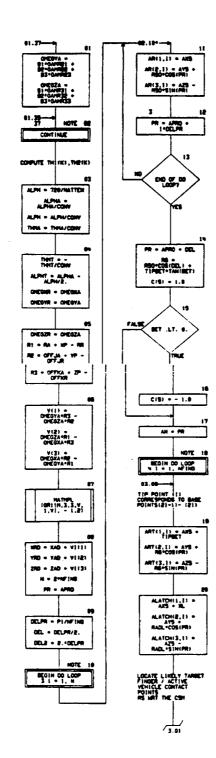
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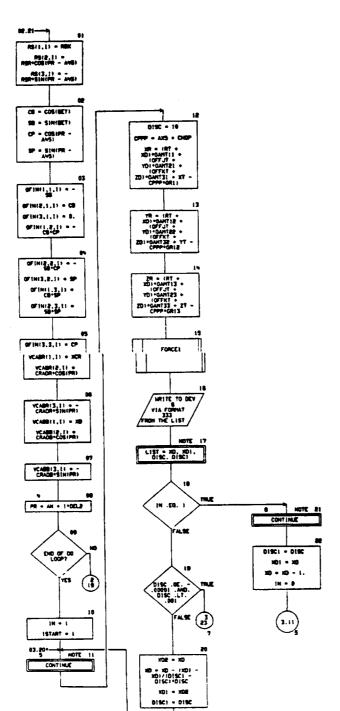
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(YA -COME = - OFFJA 213 -201 * OMMES = 174 -174 -174 * GAMES = 201 * OMMES = COMS = - OFFICA 13A -13A -13A -13A -13A -13A -13A -13A -281 • GAMASE -281 • GAMASE -287 • GAMASE -OFFICE • GAMESE -OFFICE • GAMESE -OFFICE • GAMESE -SESIN DO LOS 1011 | - 1. MATTEM D. 63 TIGHT - - TIGHT P = 15 - 11/2 DITTO ALPHA . PALPH . DOM اه.ب

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TITLE - SURBOUTINE GUTPUTCHISTS

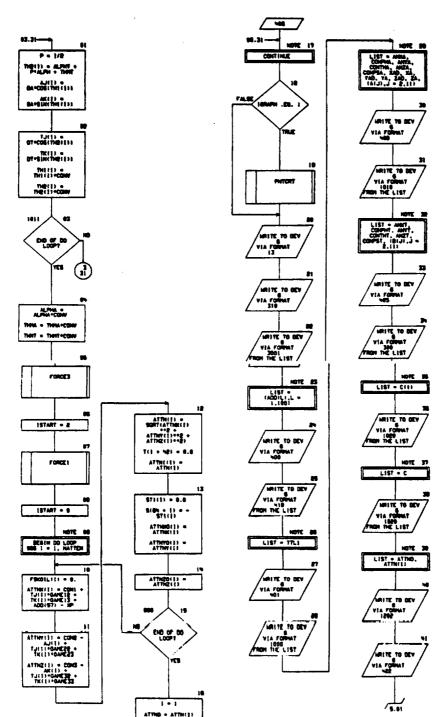
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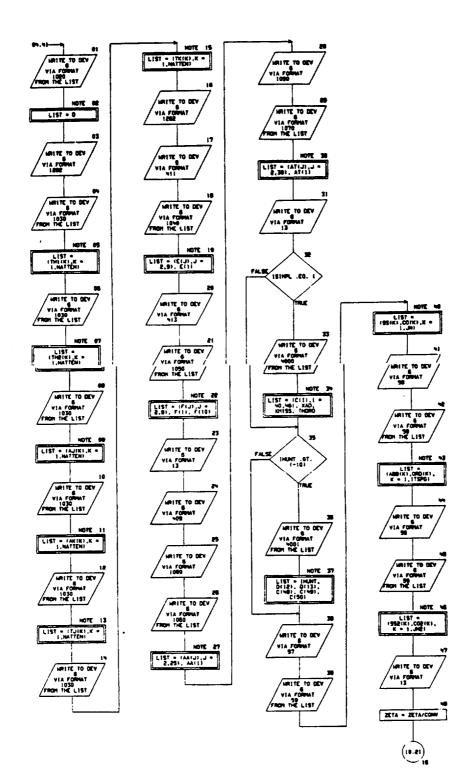
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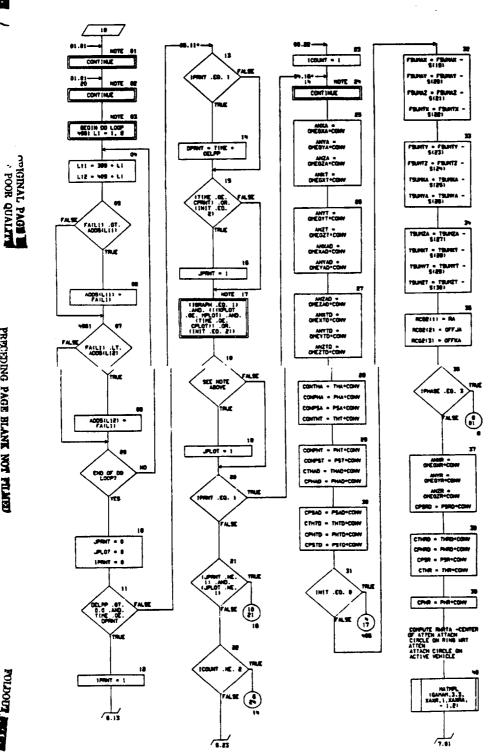
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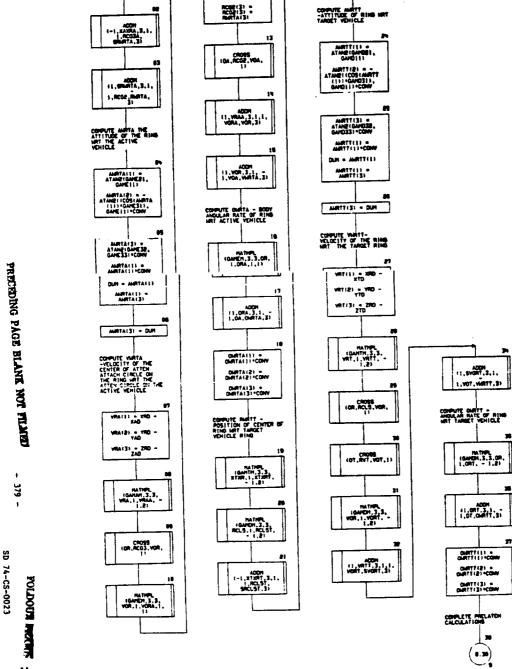
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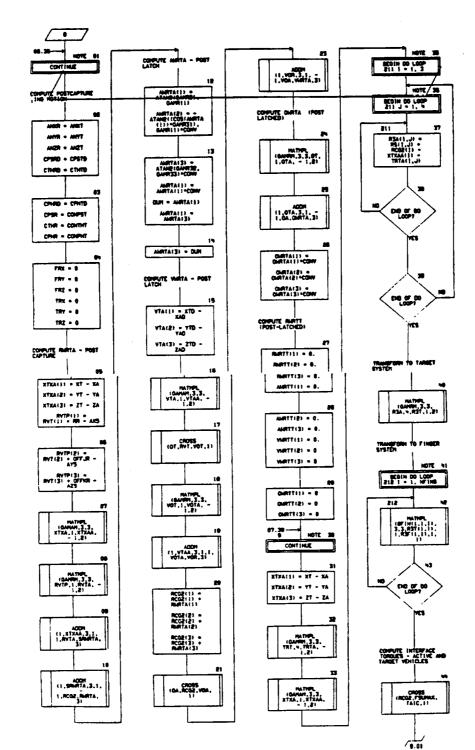
RCOP(1) .

MCGE(8) .



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POPULION A

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ADDM (1,79494.3.1. 1,741C,741.3) 1001H DO LOGP ACON(2) - OFFJT FLX(1) • CONT(1).D ACO+(3) - 0771(7 CROSS (RCO+,FSUNTX TTIC,1) FALSE FLE(1) .LT. A00H 11,19UNT.3,1. FX - - FSUNTX/4. 1.1710.771.31 TTERENTE - MAGLE F(X(1) + 0. FXS # TT1431/(24RADL) FLX(1) + FX - FXS PR(1) - PUI(1) FLX(2) + FX + FX2 FLX(3) + FX + FX3 FLX(4) + FX - FX2 8019 K - 1, 8 DUPPHKI = 8.0 K LE N ELKER LET. SEGIN DO LOOP DUPPLIK) = SKS+DELST(K) FLX(1) = 0. 2010 FR(1) + FLX(1) END OF 00 SESTN DO LOOP 1490 1 - 1, NF INS FLX(1) . 8. 800 1 00 LOOP

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CONTENT | 1 -

Space Division
Rockwell Internations

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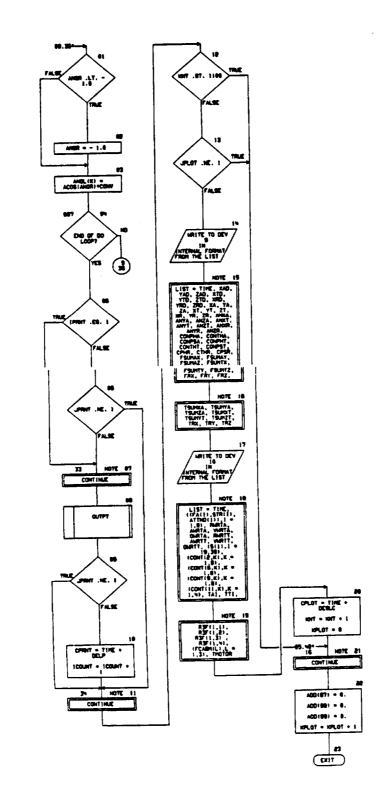
FR(1) = 0.

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DIFFERENCE (LATHIN), CONST(3)

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.5(2005)
.ACD11001
GENDAT, (GENTRE, 1861-1917A, (GENTRA, (GENTRA), (GENTRA) GENTRA
ATTIONED , FAD (20) , FA130) , AJ(20) , A((20) , T)(20) , TK(20) , TH) (30)
 , THE (20)
DINEMBLOW VARISHODS, 7(8895), A(15), 0(16), (150), 0(20), E(15), F(10),
          AA1251,A71361,C01161,SE1161
CELENA, (BIOSHTA, (BIOSHTA, (BIOSHTA NDEBICHIO
COMMUTINARI3,401,ARTI3,261
(85,E)HOTAJO, (P,E)HOTAJANOTAJNOHOO
EQUIVALENCE (ADD (71) .XL) . (ADD (72) .BADL)
(E) 14, (E) 4, (E, E) HI 190 HOLDICHIO
            , IH1T(20)
EQUIVALENCE (GRI LH(1,1),GRI 1)
DINENSION CONT(15,20)
EQUIVALENCE (ADDS (1), CONT(1,1))
EQUIVALDICE (ACCUL), (RC), (ACCUL), OFF, R1, (ACCUL), OFFICE)
          , (ACD14), XMR), (ACD15), XX(R), (ACD16), YY (R), (ACD17), ZZ(R)
           . (ACD(8) .NF (NO) . (ACD(9) . APRO) . (ACD(13) . AZS) . (ACD(19) .NET
         3, (A001)51,T(PSCT), (A00()6),TPR0),(A001)71,CH0P1
            138, (81100A1,
            . (ACC) 181 (ASC) . (ACC) (11 (ACC) . (ACC) (81 (ACC))
            , (ADD 15) , D15C) , (ADD (20) , (START)
EQUIVALENCE (T(1).XA).(T(2).XA).(T(3).ZA).(T(6).X7).(T(5).Y7).
             (7(8),27),(7(7),GHEGKA),(T(8),GHEGYA),(T(9),GHEGZA),
             (T(18), QMEQXT), (T(11), QMEQYT), (T(18), QMEQZT),
             171131, THAI, 171391, PHAI, (71151, PSAI, 171181, THTI,
             (T(17),PHT),(T(18),PST),(T(19),MP),(T(20),MP),
             (T(21),2P),(T(22),3D),(T(23),4D),(T(24),2D),
             (T(25), XAD), (T(26), YAD), (T(27), ZAD), (T(26), XTD),
              (1:29),(01),(7:30),270)
 EQUIVALENCE(T(31), MPD1, (T(32), MPD), (T(33), ZRD), (T(34), MP), (T(38),
         YR),(T(36),2R),(T(37),THN),(T(36),PSR),(T(36),PHR),(T(96),
      (452940, 17141), (470340, (1141), (430340
            .($195),(M($(1))
 . (07X0, (4)X0), (0AS0, (E1X0), (0AY0, (S)X0), (0AX0, (1)X0) 30X3AVTUD
              (0X15),(0X10),(0X10),(0X10),(0X17),(0EXA0),(0X10),(0X10)
              . (DX19) . (PEXAD) . (OX10) . (OX10) . (OX11) . (OX10) .
              (DK(12),CHE2TD), (DK(13),THAD), (DK(14),PHAD),
              (DK(15),PSAD),(DK(16),THTD),(DK(17),PHTD),(DK(18),PSTD
             >, (DX1(9), MPD), (DX(20), VPD), (DX(21), 2PD)
             , (DX(24), 200), (DX(25), XAGD), (DX(26), YAGD),
             (0075, (0030), (0074, (0530), (0078, (0530), (0085, (7530)
 CONTRACTOR (001311, 10001, 100132), 10001, 1001331, 20001, 1001341, 0000
            , (0x(35), 0x(0), (0x(36),02(0), (0x(37),1)(0), (0x(36),P$(0)
            . IDX (39) . PHID) . IDX (40) . (ONESHO) . (OK (4) ) . (ONESHO)
            . (DK1521.0PEZFD)
 COLIVALDICE (A121, MAI, (A13), MIIA), (A(4), YYIA), (A13), ZZIA),
              (AIS), XYIA), (A(7), XZIA), (AIS), YZIA), (AIS), OFF, JA),
              TACIOI.OFFRA), TACIOI, RAI
 COLIVALENCE (618), 1017), (618), 10101, (618), 17117), (618), 2217),
              (8:8), XYET), (8:7), XZET1, (8:8), YZET1, (8:9), OFFUT),
              (B(10),OFFKT), (B(11),RT)
 EQUIVALENCE (CIT), NATTENT, (CIE), DAT, (CIE), 071, (CIV), ALPINA
 (CIG), (1013), (CIG), PACLDI), (CILID), DELPRE), (CIGI), BRATE)
 (COST) (ISINFL) (10(19) (HUNT)
             (C(7), FIRM), (C(19), TIGRO), (C(28), 10195)
  . (C(5),EXT),(9,0P,C(8))
 COLIVALENCE IMPLOT,ETTT
 . ($(19) .FRCSKA) . ($(20) .FRCSYA) . ($(2)) .FRCSZA) . ($(22) .FRCSKT) .
  ($($3),FRCSYT),($($4),FRCSZT),($($5),TRCBNA),($($6),TRCSYA),
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(\$127), FRC\$2A), (\$128), FRC\$XT1, (\$129), FRC\$YT), (\$130), FRC\$2T)



			None,
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CHAFT TITLE - NON-PROCEDURAL STATISTICS

DIMENSION STI (18) ,FSIGIL (18) ,ATTHI (18) COLIVALDICE (\$(88) ,\$71(1)), (\$(79) ,F900(L(1)) EQUIVALENCE (E(8), (PMGE), (E(3), STOP), (E(4), GD,PF), (E(8), CAE), (E10) , 100APH1 , (E17) ,00LP1 , (E(0) ,009LC) , (E(0) ,...)... (E(18),1CASE)

EQUIVALENCE (FIR), THERM, (FIV), (AS), (FIR), (B), (FIR), (AL), (F(7),AE),(F(8),A4),(F(8),A7)

EQUIVALENCE (AA(E), THEOMA), (AA(3), PHEOMA), (AA(5), PSEOMA), (AMIS), (AMIA), (AMIS), (AMIA), (AMIS), (AMIS), (AMIS), CAYT, (SIJAA), CART, ELIJAA), CARRON, CRIJAA), CARTON, CRIJAA) , CACCET, TZA), CACCEO, CHIDAGO, CASCESI, CENTRAL, (AACIS), DENGAL, (AACIT), FXAL, (AACIS), SEACTAL, (ASIAR, (15)AA), (AFINA, (05)AA), (ANDAR, (05)AA)

CONTRACTOR (ATTE), CORON, (ATTE), COPRO, (ATTE), CROSS), (ATTE), CATTE), CATTE), CATTE, CATTE COMMEN, CETTAL, CETTAL (TIBLABO, ISTITA), CTEMBA, (STITA), CTHEMA, COLITA (THEORY, CENTRA, (ATCHA), (BANGE), (ATCES), THEORY), (ATC16) ,PHEORT) , (ATC17) ,PSCORT) , (ATC18) ,REACTT) , (4TC18), EART, (4TRAS, (8S) TA), (13048, (8(1)TA) (TET), (ESITA), (TET, (#SITA), (TYT, (ESITA), (TXT, (SSITA) (AT(28), PHART), (AT(27), YMART), (AT(28), PHART), (HGV1, (98) TAT (89), (48) TAT

. (11)3. (12) MARIE . (21) MARIE . (11) A. (1) MARIE . (11) A. (4137, 6821) RAPIDE (4111) AVAILED , FELLO , CARLESO , FELLO , (VARIEDEL, AACED), CVARCESEL, ATCED), CVARCESEL, COCEDI. ((1)T.((15)RAV),((1)2E.(105)RAV)

GIRCHEIGN RANKES, (E) ARMAN, (E) EDON, (E) RANKE MOISHENDE (E)ATRIAR, (E)ATVR, (E) ANT, (E)AARTK, (E, E)HEMAR, (E, E)MMAR . (E) AROV. (E) ROV. (E) RO. (E) ARV. (E) ARV. (E) ATRIAR, (E) SEOR. (ELTRY, ELATOY, ELATY, ELATO, ELATO, ELATO, ELATON (E.E)HOHAD, (E)TRO, (E)TROVE, (E)TTRV (EIATRAD, (EIADV, (E)TO, (EIATRAD, (E,E)PREAD),

XTHREE, XTHREE (2) ROLSTEE (E) ROLSTEE (E) AMRTEE), AMRTEE (E) ROLSTEE (E) ROL VOTES), VORTES), VARTES), CARTES)

EQUIVALENCE (RC63(1), ADD(1)), (GAMANI), (GAMENI), (GAMENI), (,1), QMEII1, (QMMHI, 1), QMMHI, (T(40), QM(11), (QA(11, T(7)) (117MA), (1, 1397MB), (1,139MB), (1,137MB), (1,137MB), (#D.5(1):A00(E1))

CORCINGUITH XAME, RVT, XTXR

COPPONENT/ILOUS

, IEANG, ESANG, SEANG, ELANG, SLANG, LLANG VENETAGING , IETHAD, ESTIMO, SSTIMO, ISTIMO, ELTIMO, ELTIMO, ELTIMO, EEMAD, SEAMO CHITAL CAMES, CA OMESS. GAMES, GAMES . CIDNO. SIDNO. 113402. CAMES. CAMES. . IEDWS. ESDWS, SSDWS, ISDWS, EIDWS, I IDWS, EEDWS, SEDWS EMOSS, GAMES, GAMELI, GAMELS, GAMES I, GAMESS, GATCH, GATCH, GAP11, GAP12, GAP13, GAPP1, GAPP2, GAPP3, GAPP1, CAP12.0AP13 eednd, eednd, eednd, esdnd, esdno, eednd, eidnd, eidnd, i iond,

COMON/INITAL/ARMI.TIMEPP, IPALL, JTESTH.SLOPE PROBEA, TUSA, EL HEAL, THESHI .CONST

COPPONIAMOLE/STHA, CTHA, SPHA, CPHA, SPSA, CPSA,

STHT, CTHT, SPHT, CPHT, SPST, CPST

COMMON HAND/ ILATH, SP2, 3L4, SP3, 3L3, FLATCH, TLATY, TLATZ, THUB, THUB COPPON/RECAL/S

COMMON/CALCU/FO.FC.F1.TOR1.F51.F52.F53.FCR1.FCR2.FCR3.ETAL. CTAZ,CTAS,FRTIA,FRTZA,FRTSA,TLS1,TLS2,TLS3,FRTIB,FRTZB,FRT3B. YELBI , VELBE, VELBE, VELP, FRIOP, FROI , FROE, FROE , FROBEL CONTROL /LOS/YARHI, YARME, YARRIS, M.CEL, M.CER, M.CES COMMINIFORC/FRUMAX,FRUMAY,FRUMAZ,TRUMXA,TRUMYA,TRUMZA,TRUMKT,

TRANT, TRANZT, FRANTE, FRANTY, FRANTZ

COMMON/OUT/FOX, FOY, FOZ, TORX, TORY, TORZ, STREE, STREE, STREE, STREE, STREE,



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3000 3001

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TOOUT TAIL
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FCX.FCY.FCZ
COHOLFULL/RETIME
            N/EDR/ THUPE, PHAPE, PSAPE, THITPE, PHITPE, PSTPE
                  ARDET MARINA, MARINA, MARINA, THRUA, THRUA, THRUA, THRUA
         001 A00100 A100
        ION /ADDLE/ ALT(90)
011900, 1011900, 1011000, 101100A HOLDHIO
CONVALDEE (ALFOLD, AMOUD), (ALFOLD, 500(11),
                        (ALF(21),982(1)), (ALF(31),002(1)),
                         (ALF(41), (1970), (ALF(42), JRE)
COMMUNITACIONAL, MI., TJ., TK., FA, ATTHOUSTR, ATTHUTHE, THE ATTHO
ATTML ATTMY ATTME
CONDINEFLEX/TIPE.GX(190),A00E(1900)
CONTRACTOR, CTION, STION, STIO
COMOM/FORCE/FRX,FRY,FRZ,TRK,TRY,TRZ
COMON/TRANS/GRI | . OR21 . OR32 . OR12 . OR32 . OR32 . OR33 . OR33
COMONTENT INCO
OPERSON TREAST, (05.2181), (05.2181) AREA (3.4) . RET(3.4)
   .RT(3.91.RS(3.9)
DIMENSION TATES . TYTES . TATE (3) . TYTE (3) . ACCO. (3)
COPPONISTRY/TRT(3,20)
EQUIVALENCE (C(83), RSK), (C(84), RSR)
DOUBLE PRECISION TILL.TILE
 COMMON /TITLES/ TTL1(6),TTL2(6)
COMMENT /CAT VCARRES, 101, VCARRES, 101, CARLES, 101, FCARES, 101.
                         THOTOR,FCABHEIGI
EQUIYALENCE (0:20), XCR), (0:21), CRADB), (0:22), CRADR), (0:17), XB)
 COMIN /FRCE/ CONTX49,61,CONFX(9,6),IFRCE
                             .DELST(10)
 EQUIVALENCE (SKS.C(S))
   DISCRETOR DURNING
    COPPON /OURSY/ MOLA, MINA, ANGA, CONSTA, CONTINA, CONFSA,
                              MEET, MITT, MEZT, COMPIT, CONTHT, COMPST
    COMMON /SAVC/ SAVD(382,151,SMAX(15),IOX(15)
   COMMON FRESTY CPHAD, CTHAD, CPSAD, CPHTD, CTHTD, CPSTD,
                                MOR. MITR. MER. CHIED, CTIED. CPSED.
                               MATA, MATT, YARTA, WATT, MATA, MATT,
                                GRIA,GRIT, IPRIT, JPRIT, JPLOT.
                                Q001,FL1X,FL2X,FL3X,FL1Y,FL2Y,FL3Y,FL12,FL2Z,FL3Z,
                                 AMOL. REF. TAL. TTI
   COMMON / FORE/ TORG(3.8)
   COMMINIONIEN CONT. CONT. CONT. CTRT (3, NO.) . CTRT (3, 28)
   DINOISION FLX(N),FR(N)
   DATA P1/2413843F7/,A45/240090FBA/
   FORMATION OUTPUT, IDE18-41
   POPPATI INLI
   FORMATINEX ," NO ATTENUATORS 4",13,// 1
   FORMATION ,//)
   FORMATISEX, ***** ACD - ARRAY **** *,7/3
   FORMTISH .18118//1
   F09411149.8E18.81
   FORMATIONS, JEER, 30H **** INSTIAL CONSISTENCE **** 3
    FORMATISSE, 1981 CASE NO. SAS//)
   FORMATISEX, 19H ACTIVE VEHICLE//)
   FORWATE DETROPEDIA ELB. B. DEPHANIELB. B. DEPHENYALIELB. B. DEPHENYALIELB. B. DEPHENYALIELB. B. DEPHENYALIELB.
    E18.8/3/SHONEGZAINE16.8, SKINPSANIE16.8, SKINGAGNIE16.8, SKINGAGNIE16.
    9/3X30YADHICIS.S.3X3YYASHEIS.S.3X3HCADHICIS.S.3X3HCADHICIS.S/3X3HH
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ANKELE. B., DINNOKI KADELIG. B., SKNNYY I KIDIG. B., DENNEZ I KADELIG. B./ DINNOKY I KA KELE. B., DINNOKI KADELIG. B., DINNYZ I KIDELIG. B., DIDNOFF JARNELIG. B./ DIDNOFF KAD

FORMATIZER-CHECKTINEIS.S. ZKZHPHYWEIS.S. ZKZHONEGYTINEIS.S. ZKZHPHYW

HEIB.9, BIEHRASHEIB. 8///)
FORMATISOK, 19H TARGET VEHICLE//)

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SAIGINAL PAGE

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DWIT TITLE - HON-PROCEDURAL STATEMENTS

AUTOFLAN CHAFT SET - NEED-FLAN

PME 19

1610.0/30040602711616.0,343-P974/E10.0,343-0474/E10.0,37440/1736 18.8/Brwnyt79E18.8,38WCZ179E18.8,38WeIY179E18.8, 36WCZ17 E .0///3

FORMATIVESC, C-MINNY/ ATTOMATOR DATA 1/ 3

FORMATTIN ,0E16.0)

FORMATCHE _//,9856,* 0 ~ ARMAY 1// 3

FORMTISH ,8E19.61

FORMATISEN, 17H PROSEMH CORNHOS//)

POPMETER, THIPMSE 110, SEMETOPSIES. S. SCHOOLIP CIS. S. SEMEMESE EIS.S/ SCHOOLPH 116, SHOOLPSEIS.S, SCHOOLC EIS.S, DOMESTIC

3X94FL0TEX110///)

413 FORMATISSE, LTH INTEGRATION SATA//)

FORMATISCHITTESI CIG.B.SKIMGKI 16, SKEWSSELE.B.SKEWSSELE.B. \$KB4KA14H116,3KB4A29KE16.0,3KB4A49KE16.0,3KB4A79KE16.0/

3034244E16.0,3034444E16.0///

FORMATIVEN, 244 REACTION CONTROL SYSTEM/)

FORMATIVER, BUT ACTIVE CONTROL SYSTEM/I

FORMATISKTHOOMA E18.8, SKRIPHCOMA E18.8, SKRIPSCOMA E18.8, SKRIPHCOMA Die 18. 8/ Dimmyadie 18. 8. Dimmyadie 18. 8. Dimmyadie 18. 8. Dimmya EXELS.S/ DISMOPSABLES.S, DISMONHEIS.S, DISMONHEIS.S, DISMONHE 18.8/ECROEMICA E16.8, ENTHOUGH E16.8, ECROEMICA E18.8, EXPRINGIALE 18.8/BITHMENCTA E16.8.3159GNOLARIE16.8,3159GNITARIE16.8,3159GNIEAR ne 16.8/ Eneminent 16..., eneminante 16.0, eneminante 16.0, eneminant E18.8/3X7HFEACTINE(6.8///)

FORMATIVEX, SWI TARGET CONTROL SYSTEM/)

FORMATI DESIGNADI YERELG. O. DEMPOTZ DICIS. U. DESIGNATI RETEXELO. O. DESIGNATIVE C16.6/DroughtDiel6.6, DroughtDiel6.0, DroughtDiel6.0, DigworhtDie 18.8/3X9WBTKTZNE16.8.3X9WGPSTZNE18.8.3X7MGBMKT C16.8.3X7MGBMYT

> EIG.G/BITHCOMET EIG.G, BITHMICONT EIG.G, BITHMICONT EIG.G, BITHMI HT CIS.S/DITHOCACTT CIS.S. DICHONORT CIS.S. DICHONOT CIS.S. DICHON NET C18.9/3/30001WE16.6,3/3/000WE16.9,3/3/003WE16.9,3X/3/7/WE 18.9/309-00MITERELS.S. SIGNIFICATION (S.S. SIG 118/ 38WIVEXENTS

.DETROEACTITÉ (6.8///)

FORMATIVI, NEXT, 31H SIMPLIFICO INITIAL CONDITIONS VILENSMIN VE.BIS TALLSMYSE, B.BISSESMINKE, B.BISSTOTHINKE, B. DESCRIPTION OF THE PROPERTY OF

EIS.8/3/ROMISS EIS.8,3/RHTIGRO EIS.S//)

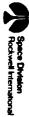
FORMATIVE, WENT, SIN STABILITY PARAMETERS OF HURT VESTIMINATE IS. VE. BESCHILLMERE, B. BESCH, TUDIERE, B. BESCHILLMERE, B. SISMIMMENE, B. BISMINIMENE (8.8//)

PORMATIZZIN NTK, METURN GRIFICE AREA TABLETZI

FORMATI /, WTX, 1 STROKE VS AREA TABLE 1/ 1

FORMATITIES NOW, 'ATTEMMENTOR SPRING LOAD TABLE'T

FORWATININEIS.0,5K,E15.07



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LOCATIONS OF PRIMARY FUNCTIONS

The following is a list of primary functions and their locations in the program. Purpose of the list is to aid the user in locating possible modifications.

Function

Basic docking system geometry Attenuator hydraulics Guide loads Attenuator forces Ring loads Latch loads Retract system equations Vehicle control systems Basic equations or motion Integration Graphs Print

Subroutine

FORCE 1, FORCE 3 OUTPUT
SHOCK
FORCE 1
FORCE 1, FORCE
FORCE 1
FORCE 3
RCS
MAIN, MASTER
MASTER, DERFUN
GRAPH, PNTCRT
OUTPUT, OUTPT

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